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PROPOSAL

GREAT LAKES COOPERATIVE PORT PLANNING STUDY

TECHNICAL SECTION



HARRIS

Frederic R. Harris, Inc.

September 2, 1977

U.S. National Oceanic and Atmospheric Administration
Maritime Administration



HARRIS

Proposal

Maritime Administration
U.S. Department of Commerce

for the
Steering Committee

GREAT LAKES COOPERATIVE PORT PLANNING STUDY

- TECHNICAL SECTION -

by

Frederic R. Harris, Inc.

3003 New Hyde Park Road
Lake Success, N.Y. 11040

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LETTER OF TRANSMITTAL



HARRIS

Frederic R. Harris, Inc., Consulting Engineers, 3003 New Hyde Park Road, Lake Success, New York 11040 516-328-7700
Cable Harkob Telex 224136 Domestic Telex 14-7137

September 2, 1977

Research Contracts Division
Office of Administrative Services
and Procurement
Room 6066
U. S. Department of Commerce
Washington, D.C. 20230

Attn: Mr. Carroll Day

RE: Solicitation No. 7-38057

Gentlemen:

Frederic R. Harris, Inc. is pleased to submit its proposal in three sections to assist the Maritime Administration and the Great Lakes Steering Committee in completing the urgently needed Great Lakes Cooperative Port Planning Study.

This is a proposal for change. The Technical Section describes a path to a program for realizing the Lakes' true cargo moving capability, and involves two essentials: Drawing up a picture of that capability; and producing an implementable strategy which blends resources of the ports with the needs of port users. Harris's approach puts prime importance on identifying and planning for this port users group. By aligning its actions with the economic imperatives facing users, the Great Lakes ports will find themselves in concert with technological and economic trends, and will discover new sources of support for their individual and joint development and marketing strategies. Chapters 1 to 3 describe this study approach in increasing detail.

I wish to call particular attention to the professional team proposed in Chapter 4. This team blends economic and planning skills with practical engineering considerations. Each member has extensive experience with the proposed approach and can work cooperatively and tactfully with the various study



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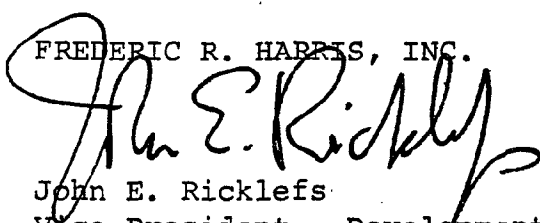
participants. Some of our recent studies -- and the real actions stemming from them -- are discussed in Chapter 5.

In preparing this proposal, we have been very mindful of past and concurrent studies by others. Our planning approach is designed to make full use of these efforts by dovetailing their outputs with the Cooperative Port Planning Study inputs, limiting new data collection to the minimum needed for successful completion while avoiding overlap or duplication. A dynamic and useable information system will result.

We are prepared to supplement this proposal with additional documentation or personal presentations as you may require, and look forward to serving you and the Great Lakes Steering Committee on this project in the near future.

Sincerely yours,

FREDERIC R. HARRIS, INC.



John E. Ricklefs
Vice President - Development Planning

JER:hn





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SECTION 1



1.0 OBJECTIVE AND SCOPE

This proposal outlines a Cooperative Great Lakes Port Planning Study to guide the development of Great Lakes ports and related goods transport systems and services.

The objectives of this study are derived from the U.S. Great Lakes - Seaway Port Development and Shipper Conference, (Dearborn Conference) work elements, specifically: 1-1-9, Port Marketing and Planning Strategies; and 2-1-2, Centralized Data Files and Software Programs.

As defined in the Request For Proposal, this study is to identify and address all problems relating to the above two work elements. Specifically, its objectives are:

1. Define the existing and potential cargo flows of all types, from all origins and destinations in domestic and foreign commerce favorable to the Great Lakes ports based on sound economic and logistic criteria and judgment in a total distribution context. This represents present and future demand for transportation service.
2. Estimate the capability and/or capacity of the total transportation system (inland feeder, port, and water carrier capacities which represent the service supply) to handle the existing and potential cargoes and anticipate changes in cargo movement trends and capacity requirements.



3. Prepare marketing and planning strategies by which Great Lakes states and ports may realize the indicated cargo potential and assure the necessary capability.
4. Develop a consolidated data system and information processing techniques which will periodically update the cargo flows and transportation market and development strategies.

In the accomplishment of these basic objectives, existing studies, data files and plans are to be analysed and used to the maximum. Furthermore, the study is to coordinate with other concurrent studies and to analyze and assimilate the data and findings of these studies.

The scope of the study is understood to include the Great Lakes and St. Lawrence Seaway Region -- including the economic space of its service area. The study will give detailed consideration to the transportation systems serving this region and will include both those routings through Great Lakes ports as well as competing routings. The study will be comprehensive, in that it will focus on the following interdependent elements:

- Goods movement systems: commodity trade, routing networks, services, and the future demands for increased volume and service requirements
- Physical development systems: capacity and capabilities of ports, carriers, and related infrastructure



- Institutional systems: State and Federal agencies, Great Lakes related agencies, regulatory groups, carrier conferences and organizations, and cooperative organizations.

The study will consider, in depth, all aspects of transport routings which currently handle cargoes generated by shippers/consignees located in the Great Lakes service area and which will be affected by the diversion of such cargoes to routings through Great Lakes ports. The study will focus on those Great Lakes ports and related services which offer service to the shipper and consignee public located in the region. At a minimum, the study will include the following ports:

Chicago	Buffalo	Muskegon
Toledo	Green Bay	Ludington
Duluth	Manitowoc	Saginaw
Superior	Oswego	Bay City
Milwaukee	Kenosha	Port Huron
Detroit	Burns Waterway Harbor	Lorain
Cleveland	Indiana Harbor	Ashtabula
Erie	Holland Harbor	Ogdensburg

SECTION 2



2.0 UNDERSTANDING, APPROACH, AND METHODOLOGY

2.1 THE CHALLENGE

Fundamentally, Frederic R. Harris, Inc. sees the objective of this study as maximizing the benefits of Great Lakes waterborne commerce to the Great Lakes Region. As the Request for Proposal describes, the Consultant is asked to follow a phased approach to define the market potential and related Great Lakes ports and services development plans which maximize these benefits. By definition, however, these study products describe "potentials"; they do not, per se, mean the realization of commerce flows.

The real challenge of this study, addressed in Phase IV, is to transform these potentials into reality -- and in a time frame which preserves the validity of the potentials.

Great Lakes ports are now well aware that commerce which they are not handling is in fact moving in their respective trade areas. They are also convinced that they should be handling at least a part of it. Frederic R. Harris, Inc., working in close cooperation with the Great Lakes Steering Committee, will specifically identify and classify the sources of that commerce, and set out the specific cost-savings which the Great Lakes ports can offer to these shippers/consignees. The study will show how to meet all of the non-cost service requirements as well.

Thus, we propose not to provide "another study;" instead, the ports will have a new and powerful means of coordinating and promoting their independent respective development efforts.

- Plans and information will be provided which delineate and justify port development efforts relative to the handling of total system commerce.
- A system to provide all responsible parties with on-going intelligence will be described.
- Great Lakes States will be provided data to support their industrial development efforts to retain and make their existing industry more competitive in the market place.
- States and ports will be provided with specific information to use in attracting new industry which has transportation cost requirements which are significant to their location decisions.

This information system -- however significant and pertinent -- is not sufficient to insure that necessary actions will be taken, or, in fact, can be taken within existing organizational and institutional constraints. The challenge of this study is, therefore, to examine existing and alternative strategies and cooperative mechanisms to determine that combination which offers greatest promise of positive action to transform potential commerce into real shipments. Hypothetical benefits to



industry can thereby be converted into real savings, and in the process, a stronger and more viable Great Lakes ports system can develop.

2.2 SHIPPER/CONSIGNEE ORIENTATION

As previously mentioned, the basic objective of this study is to maximize benefits of waterborne commerce for the Great Lakes Region. It should be stressed at the outset, that the focus of the study as defined by this proposal is not to promote the development of Great Lakes ports, but to determine how Great Lakes ports best can promote the development of the Great Lakes Region. The Harris study approach does not assume that what is good for the ports -- as establishments or employers -- is necessarily good for shippers or consignees or the corresponding state's economy.

The underlying assumption of this study is shipper/consignee related. That is, the reason for any port is to serve the area (termed "service area" in this proposal) to and from which waterborne commerce moves at the lowest possible total distribution costs (door to door). The effectiveness of each port should be measured not against any other port, but in how well it meets the needs of shippers and consignees in its least-cost service area.



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This concept of shipper preference (least-cost) provides the only possible foundation for cooperative port actions. It implies that in practice there will be a minimum of inter-port competition for the same commodities or shippers. A port need have only those facilities and provide only those services for which there is a tangible requirement. Thus whether a port is just like any other, or whether it does or does not have a particular type of equipment, often becomes irrelevant. The "me too" syndrome which produces unproductive and costly white elephant installations can be avoided. As important, that port which carefully identifies and equips itself to serve its service area's needs can develop public acceptance and support. It will be able to demonstrate its contribution to the economic well-being of its service area in real terms. It will also be in a much better position to finance its port operations out of realistically structured revenues and, perhaps to fund its own future development.

2.3 APPROACH

The approach represented by this proposal views ports as one of several elements in a multimodal system of transportation linking shippers and consignees in the Great Lakes Region to their distant markets. The objective of the total system, to which every element must contribute, is to provide the transport and handling services required to move goods to desired destinations at the least possible additional cost



to the final commodity price. The competitive position of the Great Lakes industrial corridor is in this sense determined by the cost of transportation.

Recent surveys carried out by Frederic R. Harris, Inc. and others have shed some light on the current role of transport costs in the market competitiveness of Great Lakes industry.

- For instance, transportation accounts for approximately 28 percent of the cost of delivered (rail) steel products from plants located in the North Central Great Lakes area to the East Coast, compared to 23 percent from Gulf Coast plants and only 18 percent from Japan.
- A major consumer products firm in the Fortune 500 list, which exports the world over from upstate New York (via tidewater ports) finds that transportation costs as a percentage of delivered price in foreign markets has now reached an intolerable 27 percent. The firm is contemplating relocation.
- A major U.S. automobile producer recently ordered the distribution manager for its Detroit plant to cut transport cost by 4 percent on production inputs from domestic or foreign sources. Owing to competition, the company must realize these savings or move production to its plants located in the South on inland waterways.



- Perhaps the most interesting example is that of a corrosives producer located on the Great Lakes. Seven years ago, the company used a nearby Great Lakes port for its exports. Recently, however, the company has shifted to moving its products by container via tidewater ports. During this period, transport costs have risen from 15 to 24 percent of the delivered price, due mainly to the greatly increased outlays required to deliver the containers to the port.

It is apparent that the quality and cost of the total system of transportation within which ports function directly influences the extent of the industrial market, the size of the industrial work forces and, of course, the taxes industry pays.

2.4 A QUESTION

The objective of this transportation system is to enhance the economic development of the regions served by the Great Lakes ports. It is the lesson of Harris' recent and extensive experience working with Great Lakes ports that no other "sea coast" in America offers its hinterland such a potential for cost-saving port service. Probably one of the most important questions to be answered by this study is whether, in fact, the needs of the Great Lakes shipping public are best served



by the evolving pattern of concentrated shipping functions in a few tidewater ports. Is it not possible that, by means of specialized functions and coordinated action, the Great Lakes ports can perform to the advantage of Great Lakes industry? It is possible, provided that functions are designed and operated to optimize all aspects of the specific service requirements of the transportation system involved in the movement of each commodity.

Accordingly, in this proposal, the roles of Great Lakes ports are to be determined by the extent to which they represent the least-cost routing of commodity inputs and outputs of the Great Lakes regional economy. In turn, the specific functional specialization of the ports are to be determined by the handling, storage or distribution requirements of goods routed through these ports at the least total distribution costs to Great Lakes shippers and consignees. The economic significance to the economy of port functions thus determined is measured in the resultant money savings to shippers and consignees. These savings or "benefits" will be considered to equal the difference in transportation costs between a least-cost routing through a Great Lakes port and that currently taken by the goods in transit.



2.5 HISTORY OF THE HARRIS APPROACH

The approach to regional port planning described in this proposal was developed and applied as part of a recent study completed for the New York State Department of Transportation, entitled Comprehensive Upstate New York Public Ports Study.

The study indicated that the availability of Great Lakes ports saved New York shippers and consignees \$9.1 million (in 1974) in reduced transportation costs. Furthermore, \$19.6 million could have been realized if traffic now moving through other modes and ports had been diverted through Upstate New York ports. The study recommended major capital improvements (\$30 million) and a coordinated marketing plan. As part of the study marketing documents were prepared for each port showing the name and address of each shipper or consignee to which the port could provide least-cost service. The document also contained a comparative transportation cost proforma for the shipments or receipts of each shipper/consignee, showing in detail how the port could reduce the firm's total transport costs.

The study showed that the trend towards increasing public port deficits could be reversed. Investments in facilities needed for each port to develop its special potential will yield high benefits to the economy, as well as to the individual ports. Other policies recommended by the study included:



- Proposed new facilities will generate revenues, high and dependable enough to be financed through revenue bonds.
- User charges can and should be increased to eliminate current and future port deficits. With proposed increases, only a minimal loss of potential and existing traffic will occur. Further, user charges should be set to recover port operations, rehabilitations and the full capital cost of existing and proposed facilities, whether previously financed through loans or grants.
- Accelerated repayment of existing loans will be self-defeating and make bond financing impossible.
- No change in existing authority functions and responsibilities.
- State assistance with common problems through participation in an Upstate Ports Council.
- Formation of a shippers association.

Following the completion of the study, both the Upstate Ports Council and a shippers association have been formed. Based on the recommendation of the Upstate Ports Council, the New York State Department of Transportation is currently formulating plans to provide a data and information service to the ports. The service will essentially update the information provided in the original study in an on-going manner.

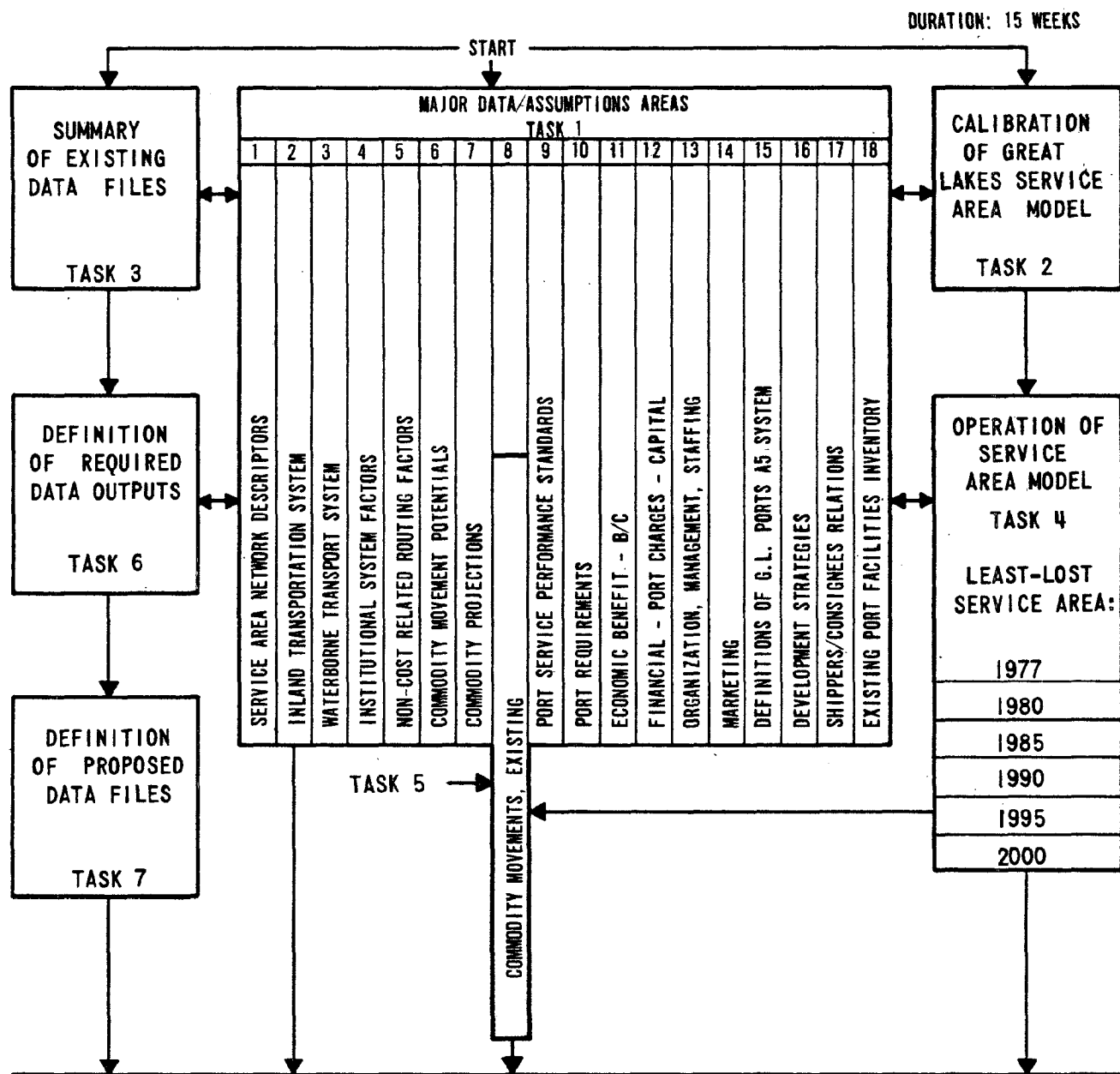


Since the completion of the Upstate New York Ports Study, Frederic R. Harris, Inc. has had the opportunity to develop its approach and accompanying software to a higher level of detail and flexibility. The approach was selected by the American International Development Agency (AID) for use in planning the Egyptian ports system till 2020. In its selection of Harris, AID referred to the approach as "... most successful at integrating robust economic methodology with practical short and long run problem solving -- in a manner focusing on regional organization, strategies and issues".

2.6 PROPOSED STRUCTURE OF THE GREAT LAKES
 COOPERATIVE PORTS STUDY

As requested in the RFP, the study will be carried out in four phases. The elements and flow of the work effort for each phase are illustrated on Figures 1, 2, 3 and 4.

2.6.1 Phase I. As can be seen on Figure 1, Flow Diagram of Phase I, the work effort concentrates on the development -- in coordination with contractors of other studies -- of an extensive bibliography on 18 major data/assumption areas. The calibration and operation of a Great Lake Service Area Model is used as a means for testing available data and defining areas in which data is currently lacking. The Great Lakes Service Area Model is designed to



PHASE I PRODUCTS:

1. BIBLIOGRAPHY AND SUMMARY INFORMATION FILES FOR 18 (PLUS) DATA/ASSUMPTION AREAS, INCLUDING A PRINT OUT OF EXISTING PORT FACILITIES
2. SUMMARY AND SAMPLES OF EXISTING DATA FILES
3. DESCRIPTION AND CALIBRATION OF GREAT LAKES SERVICE AREA MODEL
4. DESCRIPTION OF DATA REQUIREMENTS
5. DESCRIPTION OF ADDITIONAL DATA FILES
6. PRINT OUTS OF COMMODITY FLOWS GENERATED BY G.L. REGION BY SHIPPER/CONSIGNEE AND TRADE ROUTE
7. DELINEATION OF GREAT LAKES LEAST-COST SERVICES AREAS, BY PORT, FOR 1977, 1980, 1985, 1990, 1995, 2000
8. PRINT OUT LEAST COST COMMODITY FLOWS BY ZONE, CARGO HANDLING CATEGORY, TRADE ROUTE, AND COST SAVINGS OVER NEXT LEAST COST ROUTING
9. REVISED PLAN FOR PHASE II
10. DRAFT PHASE I REPORT
11. STUDY REVIEW MATERIALS
12. PHASE I FINAL REPORT

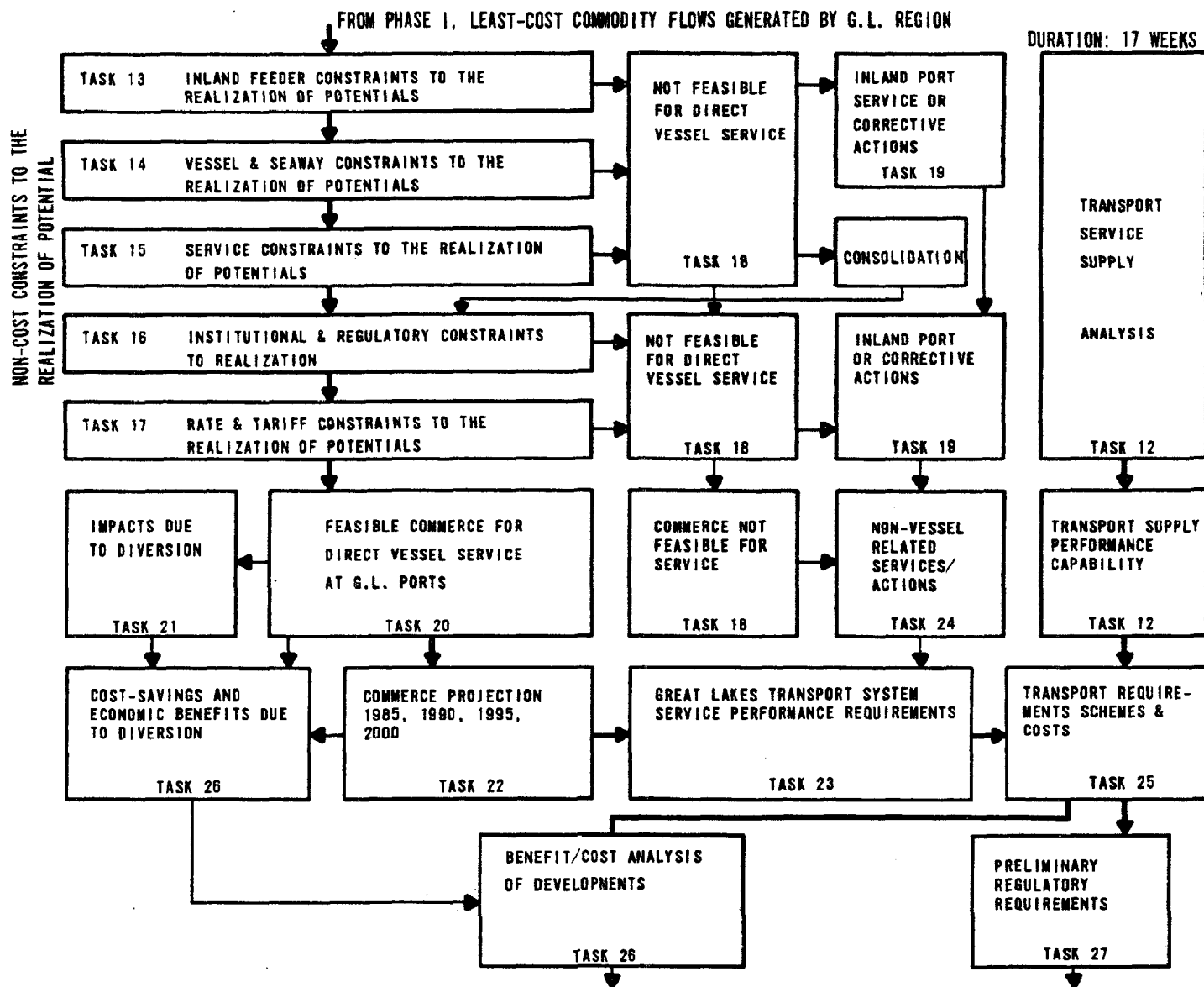
FIGURE 1

**GREAT LAKES COOPERATIVE PORTS STUDY
FLOW DIAGRAM OF PHASE I**



define, on the basis of total system transportation costs per ton, the extent of the economic service areas for each port. It simultaneously defines the location, trade route, and cargo handling characteristics of each port's several service areas. In this manner, the process of surveying commodity flows currently moving in the region can be highly focused. Phase I also provides a definition of proposed files. The outputs or products of Phase I are listed on Figure 1.

2.6.2 Phase II. Figure 2 presents a flow diagram of proposed Phase II efforts. Essentially, commodity flows which could potentially move at least-cost through Great Lakes ports are further tested in terms of a series of non-cost constraints shown on the boxes representing Tasks 13, 14, 15, 16 and 17. Commodity flows surviving this test are considered to be feasible for direct vessel service at specific Great Lakes ports, see Task 20. Flows excluded are further tested for services (inland port services) which the respective port may provide in their regard. Feasible commerce flows are projected till 2000 in Task 22 and further translated into service performance requirements in Task 23. These requirements are compared with available or planned capacities in Task 25.



PHASE II PRODUCTS:

13. EVALUATION OF NON-COST CONSTRAINTS TO THE REALIZATION OF G.L. PORTS POTENTIAL
14. PRINT OUT OF POTENTIAL COMMERCE FEASIBLE FOR DIRECT VESSEL SERVICE AT G.L. PORTS, BY SERVICE AREA ZONE, G.L. PORT, TRADE ROUTE, COST SAVINGS.
15. SUMMARY OF NON-FEASIBLE COMMERCE FOR DIRECT VESSEL SERVICE.
16. DEFINITION OF PORT NON-VESSEL RELATED SERVICES.
17. IMPACTS FROM DIVERSION DUE TO DIVERSION ON OTHER PORTS AND MODES.
18. CARGO PROJECTIONS TO 1980, 1985, 1990, 1995, 2000
19. PERFORMANCE REQUIREMENTS FOR GREAT LAKES TRANSPORT SYSTEM TO SERVE POTENTIAL.
20. DESCRIPTION OF G.L. SERVICE SUPPLY CAPACITY.
21. DESCRIPTION OF CONSOLIDATED INLAND PORT SERVICES.
22. PORT DEVELOPMENT SCHEMES AND COSTS.
23. BENEFIT/COST ANALYSIS.
24. PRELIMINARY REGULATORY REQUIREMENTS
25. REVISED PHASE II AND III WORK PLAN
26. DRAFT OF PHASES I AND II
27. REVIEW MATERIALS
28. FINAL REPORT OF PHASE I AND II

FIGURE 2

**GREAT LAKES COOPERATIVE PORTS STUDY
FLOW DIAGRAM OF PHASE II**



Also in this task, development schemes for each port will be drafted and their costs estimated. Finally Task 26 develops benefit/cost justifications for the various schemes. The products of Phase II are listed on Figure 2.

2.6.3 Phase III. Figure 3 presents a flow diagram of proposed Phase III efforts. This phase reviews and incorporates the inputs from other concurrent studies. Where required, the analytical process carried out in Phase II will be rerun to produce definitive products.

The products of Phase III are listed on Figure 3.

2.6.4 Phase IV. Figure 4 presents a flow diagram of the proposed Phase IV effort. As shown on the diagram, this phase will carry out a systematic and coordinated analysis of alternative action programs for Great Lakes ports individually or as a system and for regional shippers/consignees in each port service area or in the entire Great Lakes service area. Utilizing a coordinated issues analysis matrix, shown in Figure 4, data and conclusions developed in Phase III will be translated into two sets of common issues areas for ports and shippers/consignees. Further, the procedure illustrated will make possible the preparation of focused and coordinated alter-

DURATION: 13 WEEKS

INPUT OF DATA, INFORMATION
AND ASSUMPTION FROM CON-
CURRENT STUDIES:

- TRAFFIC, COMPETITION &
FEEDER
- BULK FACILITIES IMPROVEMENT
- MID-AMERICA
- DEPARTMENT OF COMMERCE 1976
COMMODITY O/D STUDY
- G.L. MAXIMUM VESSEL SIZE STUDY,
CORPS OF ENGINEERS
- REVIEW & MODIFICATION OF
PHASE II DEVELOPMENT SCHEMES
BY PORT OFFICIALS
- OTHERS

TASK 32

ADJUSTMENT OF FILES
FOR 18 DATA AREAS
(SEE TASK I) TO
INCORPORATE INPUTS
FROM OTHER STUDIES

TASK 34

REVISED CONSOLIDATED
DATA SYSTEM
CONCEPTUAL PLAN
AND STRUCTURE

TASK 33

RERUN PHASE II
ANALYTICAL PROCESS
AS REQUIRED BY
NEW DATA INPUTS

PHASE III OUTPUTS:

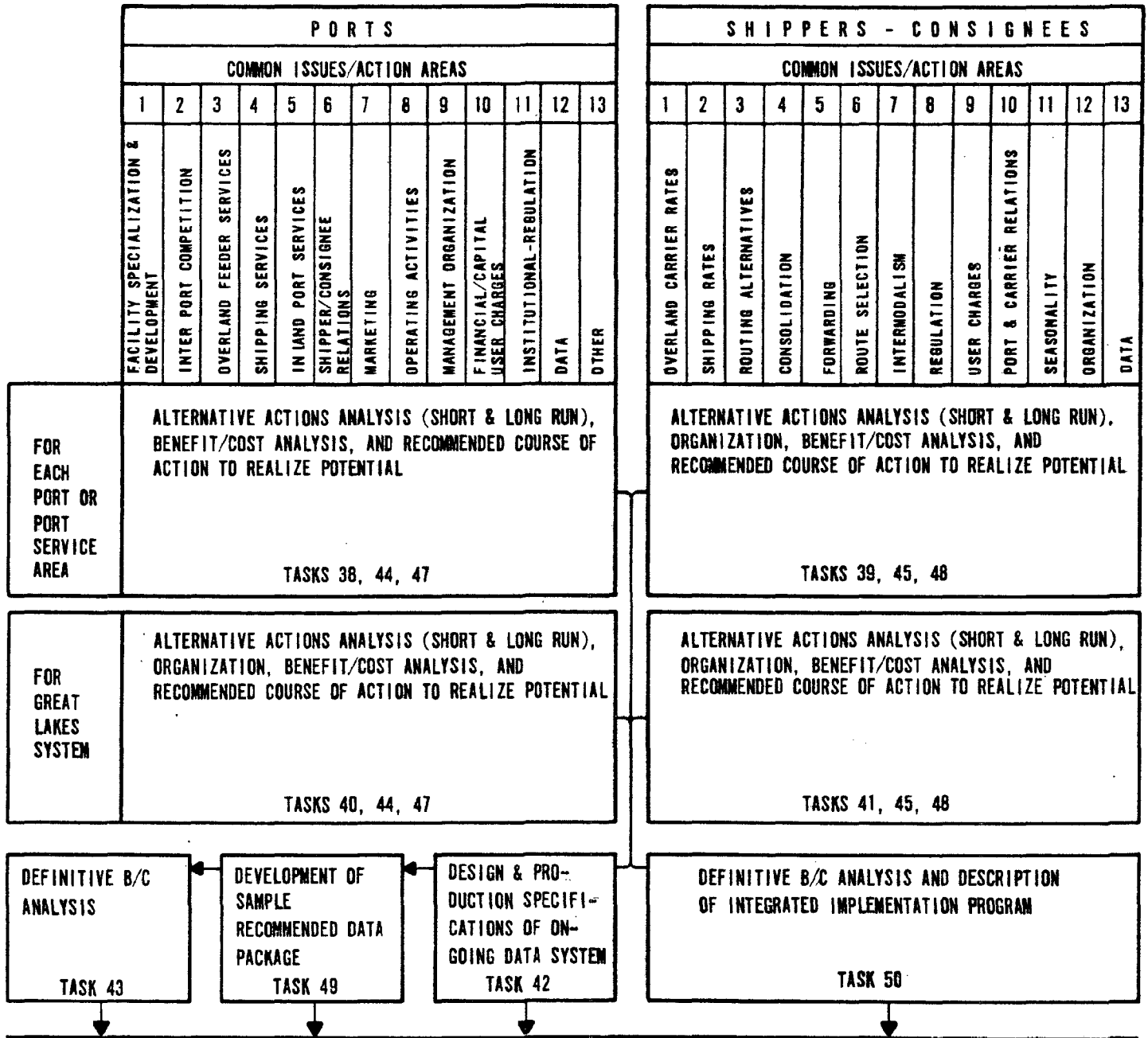
29. DEFINITIVE BIBLIOGRAPHY AND FILES FOR 18 PLUS MAJOR DATA/ASSUMPTION AREAS
30. REVISED CONCEPTUAL PLAN AND STRUCTURE FOR CONSOLIDATED DATA SYSTEM
31. DEFINITIVE (REVISED AND ADJUSTED ACCORDING TO REPORTS FROM CONCURRENT STUDIES)
PHASE II OUTPUTS 13 THROUGH 23

FIGURE 3

GREAT LAKES COOPERATIVE PORTS STUDY
FLOW DIAGRAM OF PHASE III



native short and long run development strategies. The products of Phase IV are listed on Figure IV.



PHASE IV OUTPUTS:

- | | |
|---|---|
| <p>35. SUMMARY OF ANALYSIS ON DATA SYSTEM ALTERNATIVES</p> <p>36. SUMMARY OF ANALYSIS ON COMMON ISSUES/ACTION AREAS AND DEVELOPMENT STRATEGIES FOR EACH PORT</p> <p>37. SUMMARY OF ANALYSIS ON COMMON ISSUES/ACTION AREAS AND ORGANIZATIONAL-DEVELOPMENTAL STRATEGIES FOR GREAT LAKES PORTS SYSTEM</p> <p>38. SUMMARY OF ANALYSIS ON COMMON ISSUES/ACTION AREAS AND ORGANIZATIONAL-DEVELOPMENTAL STRATEGIES FOR SHIPPERS/CONSIGNEES IN EACH PORT SERVICE AREA</p> <p>39. SUMMARY OF ANALYSIS ON COMMON ISSUES/ACTION AREAS AND ORGANIZATIONAL-DEVELOPMENTAL STRATEGIES FOR SHIPPERS/CONSIGNEES IN GREAT LAKES SYSTEM (REGION)</p> <p>40. BENEFIT-COST ANALYSIS OF DATA SYSTEM</p> | <p>41. BENEFIT-COST ANALYSIS OF PORT RELATED STRATEGIES</p> <p>42. BENEFIT-COST ANALYSIS OF SHIPPER/CONSIGNEE RELATED STRATEGIES</p> <p>43. DEFINITIVE SAMPLE DATA PACKAGE</p> <p>44. DESCRIPTION OF DEFINITIVE CONSOLIDATED DATA SYSTEM</p> <p>45. DEFINITIVE STRATEGIES FOR PORTS, EACH AND SYSTEM</p> <p>46. DEFINITIVE STRATEGIES FOR SHIPPERS/CONSIGNEES FOR EACH SERVICE AREA AND GREAT LAKES SYSTEM</p> <p>47. INTEGRATED IMPLEMENTATION PROGRAM</p> <p>48. DRAFT REPORT AND EXECUTIVE SUMMARY</p> <p>49. REVIEW MATERIALS</p> <p>50. FINAL REPORT</p> |
|---|---|

FIGURE 4

GREAT LAKES COOPERATIVE PORTS STUDY
FLOW DIAGRAM OF PHASE IV





The Phase IV diagram is important in another major respect: it is an indication of what a cooperative coordinated plan actually looks like. Reading up and down, ports or shipper consignees can see how their common issues and action areas affect each port or service area and how they fit in with the Great Lakes system as a whole. Reading across, actions and issues for ports can be compared with similar actions and issues for shipper/consignees. Further examination of the diagram will reveal how all actions may fit together in concert for an internally consistent blend of individual and Great Lakes-wide actions. This is what a coordinated plan is about.





3.0 DETAILED WORK PROGRAM

Section 3.1 is a list of study tasks.

Section 3.2 which follows, describes each study task in detail. These task write-ups may be read in conjunction with the foldout network diagram of study tasks which has been placed in Section 3.3, behind the study task write-ups, for ease of reference.

Section 3.4, following the network diagram, is a listing of key study events.

3.1 LIST OF PROJECT TASKS

PHASE I - EXISTING CONDITIONS

- Task 1 Summary and Analysis of Data and Assumptions on the Great Lakes System
- Task 2 Calibration of Great Lakes Service Area Model
- Task 3 Summary of Existing Data Files
- Task 4 Operation of Service Area Model and Production of Phase I Print-Outs
- Task 5 Summary and Analysis of Data and Assumptions on Commodity Flows
- Task 6 Definition of Required Data Outputs
- Task 7 Definition of Proposed Data Files
- Task 8 Revised Phase II Work Plan
- Task 9 Phase I Draft Report Preparation
- Task 10 Preparation Study Review Materials
- Task 11 Final Phase I Report Preparation

PHASE II - POTENTIAL CONDITIONS

- Task 12 Transport Service Supply Analysis
- Task 13 Inland Feeder Constraints to the Realization of Potentials
- Task 14 Vessel and Seaway Constraints to the Realization of Potentials
- Task 15 Service Constraints to the Realization of Potentials
- Task 16 Institutional and Regulatory Constraints to the Realization of Potentials
- Task 17 Rate and Tariff Constraints to the Realization of Potentials
- Task 18 Commerce Not Feasible for Direct Vessel Service at Great Lakes Ports
- Task 19 Inland Port Services or Corrective Actions Related to the Handling of Commerce Not Feasible for Direct Vessel Service at Great Lakes Ports
- Task 20 Feasible Commerce for Direct Vessel Service at Great Lakes Ports
- Task 21 Impact on Other Ports or Modes Owing to the Diversion of Commerce to Great Lake Ports
- Task 22 Commerce Projections for 1980, 1985, 1990, 1995, and 2000
- Task 23 Great Lakes Transport System Service Performance Requirements
- Task 24 Non-Vessel Related Service Requirements
- Task 25 Transport Requirement Schemes and Costs



- Task 26 Benefit/Cost Analysis of Developments
- Task 27 Preliminary Regulatory Requirements
- Task 28 Revised Phase III and IV Work Plan
- Task 29 Phase I and II Draft Reports Preparation
- Task 30 Preparation of Study Review Materials
- Task 31 Final Phase I and II Report Preparation

PHASE III - ADJUSTMENT

- Task 32 Adjustment of Files to Incorporate Inputs From Other Studies
- Task 33 Rerun Phase II Analytical Process as Required By New Data Inputs
- Task 34 Revised Consolidated Data System Conceptual Plan and Structure
- Task 35 Phase III Draft Report Preparation
- Task 36 Preparation of Study Review Materials
- Task 37 Final Phase III Report Preparation

PHASE IV - DEVELOPMENT STRATEGY

- Task 38 Alternative Action Analysis for Each Port
- Task 39 Alternative Action Analysis for Shippers and Consignees in Each Port Service Area
- Task 40 Alternative Action Analysis For All Ports in Great Lakes System
- Task 41 Alternative Action Analysis for Shippers and Consignees in Great Lakes Service Area
- Task 42 Analysis of Alternative Consolidated Data Systems
- Task 43 Benefit/Cost Analysis of Consolidated Data System Alternatives
- Task 44 Benefit/Cost Analysis of Alternatives for Each Port and the Great Lakes System
- Task 45 Benefit/Cost Analysis of Alternatives for Shippers and Consignees in the Service Area of Each Port and the Great Lakes System
- Task 46 Delineation of Consolidated Data System
- Task 47 Short and Long-Run Development Strategy for Each Great Lakes Port and for the Great Lakes Port Systems as a Whole
- Task 48 Short and Long-Run Development Strategy for Shippers and Consignees in Service Area of Each Great Lakes Port and in the Great Lakes Service Area as a Whole
- Task 49 Data Package for Use By Public, Private, Individual or Cooperative Interests in Efforts to Realize Great Lakes Potential
- Task 50 Definitive Integrated Implementation Program
- Task 51 Preparation of Draft Report and Executive Summary
- Task 52 Preparation of Review Materials
- Task 53 Final Report Preparation



3.2 DETAILED TASK DESCRIPTIONS

This proposal for the Great Lakes Cooperative Ports Study will be carried-out in four phases. The realization of these phases will be defined here in terms of 53 task. Where further explanation appears necessary, tasks are broken down into their component items. A network diagram illustrating the flow in time and interdependence of tasks is presented together with a listing of study events. The outputs of each phase have previously been described on each of the phase flow diagrams, Figures 1, 2, 3, and 4.

PHASE I - EXISTING CONDITIONS

Task 1 - Summary and Analysis of Data and Assumptions on the Great Lakes System

PURPOSE: Review, analysis, and compilation of information from existing sources will be carried out in terms of data and assumption areas which deal with the role of waterborne commerce in the Great Lakes Regions. Data and assumptions will be organized into at least 18 areas, each designed to contribute specific inputs to the series of steps in the methodological development proposed herein. Under each of the following area headings, textual bibliography and summary files will be established:



- 1.1 Description of the elements of the service area transport network (zones, nodes, links, descriptors, etc.)
- 1.2 The inland transportation system (current state and future change in modes, infrastructure, user changes, loading, speed, etc.)
- 1.3 The waterborne transportation system (current state and expected future changes)
- 1.4 Institutional factors
- 1.5 Non-cost related factors which constrain the realization of commodity routing potentials:
 - a. Inland feeder constraints;
 - b. Vessel constraints;
 - c. Seaway constraints;
 - d. Service constraints
 - e. Institutional and regulatory constraints; and
 - f. Rate and tariff constraints
- 1.6 Total distribution factors which determine commodity movement potentials:
 - a. At plant loading/unloading costs;
 - b. Overland carriage costs;
 - c. At port loading/unloading costs;
 - d. Port handling costs;
 - e. Port charges;
 - f. Vessel costs
 - g. Great Lakes & Seaway tolls and charges; and
 - h. Inventory time of goods in transit
- 1.7 Commodity projections
- 1.8 Existing commodity movements
 - a. Domestic bound cargoes generated by Great Lakes market area;
 - b. Domestic bound overhead cargoes;
 - c. Foreign bound cargoes generated by Great Lakes market area;
 - d. Foreign bound overhead cargoes
 - e. Commodities not currently in movement



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- 1.9 Port performance standards
- 1.10 Port requirements
- 1.11 Economic benefits and measurement methods
- 1.12 Financial factors including port charges and capital requirements
- 1.13 Organization, management and staffing
- 1.14 Marketing
- 1.15 Definitions of Great Lakes ports as a system
- 1.16 Great Lakes ports development strategies
- 1.17 Shipper/Consignees relations
- 1.18 Baseline inventory of port and ancillary facilities

Task 2 - Calibration of Great Lakes Service Area Model

PURPOSE: Calibration of the Harris Comflow model¹ to the parameters of alternative goods transportation routings available to Shippers/Consignees located in the Great Lakes service area. The Comflow model is designed to delineate least-cost routings for the transportation of cargo handling categories (containers, breakbulk, neobulk, dry bulk, liquid bulk -- together with several value levels within each category). The model prints out the least-cost trade route and port, the cost savings per ton over the next least-cost routing, as well as the next least-cost trade route and port. The model assumes current average capacity utilization of system elements. All aspects of the model have been compared

1. Developed as part of the Comprehensive Upstate Ports Study for the New York State Department of Transportation.



with the multimodal model developed by the Corps of Engineers as part of the Inland Navigation Systems Analysis (INSA) project. While Conflow operates on similar network assignment principals, its purpose and, therefore, outputs are different. Specifically, the model is designed to (1) describe Great Lakes port least-cost service areas in terms of cost-saving contours, (2) to examine the sensitivity of the extent of service areas to increases in cost components such as port user charges, future increased seaway user charges, increased fuel costs, etc., (3) to make possible the formation of a highly focused commodity flow survey.

2.1 Based on existing surveys of commodity flows generated by Great Lakes Region, develop cargo groupings which represent significantly different handling, storage, or carriage costs.

Cargo handling categories:

- General cargo: containerized (LO/LO, RO/RO),
breakbulk (conventional or LASH),
neobulk and special
- Dry bulk: commodity types (coal, grain, other)
- Liquid bulk

2.2 Determine current and future functional, cost, loading capacity, and time characteristics of carriers, infrastructure, and loading and unloading activities.



- 2.3 Definition of transportation network elements:
- a. Division of preliminary service area into zones (to be established: counties or OBERS)
 - b. Delineation of current and future interface points and linkages in network
 - c. Definition of transportation network coding system

2.4 Determination of print-out contents and formats.

Task 3 - Summary of Existing Data Files

PURPOSE: Provision of summary description, samples, uses, shortcomings and availability of data files and programs relating to any aspect of the 18 major data/assumption areas (see Task 1).

Task 4 - Operation of Service Area Model

PURPOSE: Delineation of Great Lakes service areas for each port and the system as a whole. Note, each port will have several service areas depending on cargo handling category, commodity value level and distant origins or destinations. Impact on the extent of the service areas owing to changes in cost factors will also be tested. Service areas will be generated for 1977, 1980, 1985, 1990, 1995, and 2000.



Task 5 - Survey of Existing Commodity Movements

PURPOSE: Based on available data sources, define and document commodity flows generated by least-cost service areas, by shipper/consignee, currently used trade route, and volume.

- 5.1 Develop print-out of existing and past cargo flows via all Great Lakes ports showing U.S. shipper/consignee, overland carriage mode, average vessel type in use, frequency and size of shipment and distant origin or destination.
- 5.2 Based on 1976 and 1977 manifest survey¹ describe on tape all foreign trade generated by Great Lakes least-cost service area in terms of (1) shipper/consignee, (2) mode of overland carriage, (3) U.S. or Canadian port of exit or entrance, (4) vessel and shipping line used, cargo handling category, and average shipment size.
- 5.3 Based on cross-referencing Schedule B numbers, check extent of coverage with other available documentation including the Department of Commerce commodity flow surveys.

1. Unprocessed tapes available from Journal of Commerce, Information Service.



- 5.4 Based on available documentation, describe on tape domestic bound shipments and receipts¹ by commodity, current mode of carriage, and zones of origin and destination and probable average shipment size.
- 5.5 Based on available documentation, describe on tape potential new commodity flows not now in movement, for instance deliveries of Western coal to eastern states.

Task 6 - Definition of Required Data Outputs

PURPOSE: Definition of data outputs not currently available but required for the execution of port and related systems planning.

Task 7 - Definition of Proposed Data Files

PURPOSE: For those data outputs identified in Task 8 and not possessing a satisfactory substitute, describe outputs in terms of use, contents, frequency of issue, formats and procedures for compilation.

Task 8 - Plan of Transfer of Phase I Outputs and the Outputs of Concurrent Studies to Phases II and III

-
1. Including movements not currently moving by water, but considered susceptible to waterbound carriage.



Task 9 - Preparation and Submittal of Draft Phase I Report

Task 10 - Preparation of Review Material and Presentation
and Discussion of Phase I Report¹

Task 11 - Preparation and Submittal of Phase I Report

PHASE II - POTENTIAL CONDITIONS

Task 12 - Transport Service Supply Analysis

PURPOSE: Definition of current capacity and capacity utilization characteristics of Great Lakes public ports.

12.1 Based on the level of new requirements revealed by a comparison of least-cost commodity potentials (developed in Phase I) with current cargo levels and current port plans, and based also on the occurrence of baseline port facilities inventory information which can only be obtained from a site visit; make arrangements for a study reconnaissance trip to each selected port.

-
1. Whereas the referenced task identifies one of four points where discussion of findings with the Steering Committee can be best conducted, on-going discussions conducted on an informal basis with the COTR and individual members of the Committee would be carried out during the entire course of the study. It will be noted that the Network Diagram of Tasks identifies three additional points where study progress reviews could be held. See Events B, G and U.



- 12.2 Carry out on-site investigations at ports and in problem areas defined in Task 12.1. Investigations limited to the accumulation of port facilities inventory and physical development baseline information.

Task 13 - Evaluation of Inland Feeder Related Constraints to the Realization of the Least-Cost Commodity Flow Potential of Great Lakes Ports

PURPOSE: Analyze commodity flow patterns in terms of known functional constraints of inland carriers. Where constraints are found to be effective, identify which commodity flows -- for such reasons -- cannot be diverted to their least-cost routing through a Great Lakes port.

- 13.1 Evaluate extent of LCL shipment, by average establishment.
- 13.2 Evaluate extent of potential capacity utilization on carrier hauls both ways, to and from ports.
- 13.3 Identify location and numbers of forwarders and NVOCC's in Great Lakes port areas.
- 13.4 Investigate possible revised overland networks considering a) dedicated TOFC or COFC unit train systems to ports; b) motor carrier networks of higher capacity utilization.



- 13.5 Where necessary, interview selected common carriers and railways as to reality of factors considered in this task.

Task 14 - Evaluation of Vessel Related Constraints to the
Realization of the Least-Cost Commodity Flow
Potentials of Great Lakes Ports

PURPOSE: Analyze commodity flow patterns in terms of the known functional constraints of vessels. Where constraints are found to be effective, identify which commodity flows cannot be diverted to their least-cost routing through a Great Lakes port.

- 14.1 Reconstitute annual commodity flows assigned to each port into cyclical deliveries.
- 14.2 Organize delivery cycle volumes on the basis of foreign or domestic origins or destinations.
- 14.3 Evaluate whether potential cargo volumes reclassified according to 14.1 and 14.2 are sufficient to warrant a vessel call.
- 14.4 If necessary, consolidate volumes to single port (must be second least-cost port) to provide sufficient volumes to attract adequate service.



Task 15 - Evaluation of Service Related Constraints to
the Realization of Least-Cost Commodity Flow
Potentials of Great Lakes Ports

PURPOSE: Analyze commodity flow patterns in terms of known service requirements by shippers/consignees not offered by Great Lakes ports -- the lack of which acts as constraints to the realization of Great Lakes port potentials. Where such constraints are found to be effective, identify which commodity flows cannot be diverted to their least-cost routing through a Great Lakes port.

- 15.1 Examine the effect of such constraints as lack of U.S. flag vessels, seaway seasonality, broker handled cargoes, hazardous cargo and others.

Task 16 - Evaluation of Institutional or Regulatory Constraints
to the Realization of Least-Cost Commodity Flow
Potentials of Great Lakes Ports

PURPOSE: Analyze commodity flow patterns in terms of regulatory constraints. Where such constraints are found to be effective, identify which commodity flows cannot be diverted to their least-cost routing through a Great Lakes port.

- 16.1 Evaluation of effect of Section 22 of the Interstate Commerce Act¹ regulations on U.S. Government freight shipments through Great Lakes ports.

1. Section 22 provides for lower inland rates on government movements as compared to commercial shipments.



- 16.2 Evaluation of effect of existing cargo preference laws¹.
- 16.3 Evaluation of effects of current pending legislation designed to limit activities of third flag vessels in U.S. trades (HR 7940).

Task 17 - Evaluation of Transportation Rate Constraints
to the Realization of Least-Cost Commodity Flow
Potentials of Great Lakes Ports

PURPOSE: Analysis of commodity flow patterns in terms of inland and vessel rates. Best available rates will be substituted for costs in the least-cost flow model (Comflow) and the resulting routings will be compared with those previously produced by using costs. Excessive differences in rates from costs -- which produce significantly different cargo routings will be further investigated in terms of their possible discriminatory nature. Where such constraints are effective and are not subject to short or long term adjustment, identify which commodity flows cannot be diverted to their least-cost routing through a Great Lakes port.

- 17.1 Evaluate the effect of intermodal/minibridge rates and routes.
- 17.2 Evaluate the effect of the lack of specific export/import rates to Great Lake ports comparable to those for tidewater ports.

1. Public Law 480 Title II cargoes must be shared on U.S. flag vessels.



Task 18 - Compilation of Least-Cost Cargoes Which Are Not
Feasible for Direct Vessel Service at Great Lakes Ports

PURPOSE: Accumulate and summarize those cargo flows found not to be feasible for direct vessel service at Great Lakes ports. Analyze and rank non-cost factors as to their relative impact on existing cargo routing patterns.

Task 19 - Description of Possible Inland Port Services of
Corrective Actions Relating to Cargoes Summarized
in Task 18

PURPOSE: Analyze cargoes for which direct vessel service is not feasible in terms of other "inland" port services which may be offered the shippers of these commodities. Determine short or long run corrective actions identified in Tasks 13 through 17.

Task 20 - Summary of Commerce Feasible for Direct Vessel
at Great Lakes Ports

PURPOSE: Accumulate all feasible cargoes passing the "squeeze-out" constraints of Tasks 13 through 17, and summarize on tape in terms of (1) shipper/consignee identification code, (2) location zone in Great Lakes service area, (3) cargo handling category, (4) annual tonnage, (5) foreign or domestic origin or destination, (6) current routing, (7) least-cost routing and Great Lakes port of preference, and (8) cost-savings accounted for by feasible diversion through Great Lakes port.



Task 21 - Evaluation of Impacts Resulting from the Feasible
Diversion of Commerce to Least-Cost Routing Through
Great Lakes Ports

PURPOSE: Qualification of the impact of diversion on replaced overland modes and tidewater ports.

Task 22 - Commodity Projections

PURPOSE: Projection of the future tonnage of feasible commodity movements in 1980, 1985, 1990, 1995 and 2000; from respective 1977 service area bases, see Task 4. Projections will be carried-out on the basis of best estimated from available studies and, where deemed necessary, framed in a low and high estimate.

Task 23 - Delineation of Service Performance Standards
for Each Great Lakes Port

PURPOSE: Based on feasible cargo types and volumes described in Task 22, develop programs and standards for port facility specializations, productivity levels, interface characteristics with waterborne and overland carriers, and the time phasing of development.



Task 24 - Delineation of Non-Vessel Related Service Performance Standards

PURPOSE: Based on the results of Task 19, develop programs and standards for port facility specializations, productivity levels, interface characteristics, and time phasing of development.

Task 25 - Development of Transport Requirement Schemes and Related Costs

PURPOSE: Identification and schematic planning of additional port and related facilities required to serve demand described in Tasks 23 and 24 in comparison with the level of corresponding supply described in Task 12. Schematic port modification plans, additional service requirements, and costs related thereto, will be submitted to those responsible in each port affected. Their review, modification, and approval will be requested. Receipt of their comments is expected to take two months.

Task 26 - Benefit/Cost Evaluation of Recommended Development in Each Port

PURPOSE: Each port development plan will be subjected to a benefit/cost analysis in which will be considered benefits to shippers and consignees as well as negative benefits to transport elements no longer required. The analysis will also be used to evaluate the optimum time phasing of specific new developments.



Task 27 - Definition of Preliminary Regulatory Requirements

PURPOSE: Based on the results of Tasks 16 and 26, develop preliminary scope of regulatory requirements.

Task 28 - Development of a Revised Plan for the Accomplishment
of Phases III and IV

Task 29 - Preparation and Submittal of Draft Phase I and
II Reports

Task 30 - Preparation of Review Materials and Presentation
and Discussion of Phase I and II Reports

Task 31 - Preparation and Submittal of Final Report

PHASE III - ADJUSTMENT OF PHASE II CONCLUSIONS

Task 32 - Adjustment of Files for the 18 Data Areas

PURPOSE: Adjustment and modification of the 18 Data Area Files, described in Task 1, to incorporate the data, assumptions, and findings from other concurrent studies. Note, while the purpose of this task is to update the 18 Data Area products, coordination with concurrent studies is proposed to begin with Event B, six weeks after the start of this study.



- 32.1 Input of data, information, assumptions, and conclusions from concurrent studies, to include:
- Traffic and Competition (and feeder service) Study;
 - Bulk Facilities Improvement Study;
 - Mid-America Study;
 - Department of Commerce 1976 Commodity O/D Study;
 - Great Lakes Maximum Vessel Size Study - U.S. Corps of Engineers; and
 - Others
- 32.2 Receipt and review of port development schemes developed in Task 12 and reviewed and modified by corresponding port officials.

Task 33 - Rerun Phase II Analytical Process

PURPOSE: Rerun Phase II analytical process as required by new data inputs from Task 33.

- 33.1 Rerun of Phase II process and production of definitive Phase I and II products. See Flow Diagrams of Phases I, II and III for List of Products.



- 33.2 For significant or key commodity flows for each port, recall shipper or consignee name and location and develop routing proforma for shipments considered to be feasible (least-cost) for diversion from current routing to one through a Great Lakes port. Routing proforma to show shipper or consignee's identification code number, cargo handling category, volume, and distant O-D of movement. Further, the proforma will compare, component by component, the total distribution costs of the current routing with the proposed least-cost routing through a Great Lakes port. These proforma will identify in detail cost reasons specific shippers should choose a lesser cost alternative routing through the Great Lakes port.
- 33.3 Using Task 33.2 proformas as base, a sample of shippers or consignees will be systematically interviewed as to their current reaction to the feasibility of using the corresponding Great Lakes port. Conditions cited by shippers/consignees will be documented. Where deemed advantageous, representatives of freight forwarders and carriers will also be contacted.



Task 34 - Description of Revised Data Consolidation System

PURPOSE: Revision and presentation of a conceptual plan and structure of ongoing data files. Files will be described in terms of their use, format, software programs and modeling requirements.

Task 35 - Preparation of Draft Phase III Report

Task 36 - Preparation of Review Materials and Presentation
and Discussion of Phase III Results

Task 37 - Preparation and Submittal of Phase III Report



PHASE IV - DEVELOPMENT STRATEGY

Task 38 - Analysis of Development Issues and Alternative Actions Required for Each Great Lakes Port to Achieve Its Potential

PURPOSE: The purpose of this task, as well as that of Tasks 39, 40 and 41, is twofold: 1) to establish a coordinated issues analysis matrix (See Phase IV Flow Diagram) designed to make possible the systematic identification of coordinated alternative action programs for Great Lakes ports individually or as a system and Great Lakes regional shippers/consignees in each port service area or in the entire Great Lakes service area. This matrix will serve as the basis for the translation of data and conclusions produced by Phases I, II and III into two sets of common issues areas for ports and shippers/consignees. Further, the procedure will make possible the preparation of focused and coordinated alternative short and long run development strategies. The tentative list of common issues and action areas for Great Lakes ports individually or a system are as follows:

1. Facility specialization and development;
2. Inter-port competition;
3. Overland feeder services;
4. Shipping services;



5. Inland port services;
6. Shipper/consignee relations;
7. Marketing;
8. Operating activities;
9. Management and organization;
10. Financial/capital/user charges;
11. Institutional - regulations;
12. Data; and
13. Intermodal competition

The tentative list of common issues and action areas for shippers/consignees located in the service area of each Great Lake port or the entire Great Lakes service area are as follows:

1. Overland carrier rates
2. Shipping rates
3. Routing alternatives
4. Consolidation
5. Forwarding
6. Route selection
7. Intermodalism
8. Regulations and regulatory agencies
9. User charges
10. Port and carrier relations
11. Organization
12. Seasonality of seaway service
13. Data



Task 39 - Analysis of Issues and Alternative Actions by Shippers and Consignees Located in the Service Areas of Each Great Lakes Port In Order to Achieve Lowest Possible Transportation Costs and Best Service for Their Goods

Task 40 - Analysis of Issues and Alternative Actions Required for the Great Lakes Port System to Achieve Its Potential

Task 41 - Analysis of Issues and Alternative Actions by Shippers and Consignees Located in the Great Lakes Service Area In Order to Achieve Lowest Possible Transportation Costs and Best Service for Their Goods

Task 42 - Development of Comprehensive Data and Information System

PURPOSE: Elaboration of the definitive data and information system serving the ongoing needs of ports and shippers as defined in Tasks 38, 39, 40 and 41. The system will be described as a file processing and output process and will be accompanied with related software and other model requirements. Recommendations will be made concerning the staffing, location and cost of the system. Alternative arrangement differing in levels of service and costs will be defined.



Task 43 - Definitive Benefit/Cost Analysis of Comprehensive
Data and Information System

PURPOSE: The selection of the recommended data and information system will be based on a benefit/cost analysis of alternatives developed in Task 42.

Task 44 - Definitive Benefit/Cost Analysis of Action
Strategy Alternatives for Great Lakes Ports

PURPOSE: A recommended, coordinated short and long run development strategy for each port and the Great Lakes port system will be selected on the basis of benefit/cost analysis to be carried out in this task.

Task 45 - Definitive Benefit/Cost Analysis of Action Strategy
Alternatives for Shippers/Consignees

PURPOSE: A recommended, coordinated short and long run development strategy for shippers/consignees located in the service area of each port and in the Great Lakes service area will be selected on the basis of benefit/cost analysis to be carried out in this task.

Task 46 - Definitive Description of the Recommended Comprehensive
Data and Information System

PURPOSE: A detailed description of the definitive data and information system will be based on the results of the benefit/cost analysis carried out in Task 43.



Task 47 - Definitive Description of the Recommended

Coordinated Strategy for Great Lakes Ports

PURPOSE: A detailed description of the definitive, coordinated development strategy for Great Lakes ports -- for each port and for the ports system -- will be based on the results of the benefit/cost analysis carried out in Task 44.

Task 48 - Definitive Description of the Recommended

Coordinated Strategy for Shippers/Consignees

PURPOSE: A detailed description of the definitive coordinated action strategy for shippers/consignees -- individual port service areas or the Great Lakes service area -- will be based on the benefit/cost analysis carried out in Task 45.

Task 49 - Development of Sample Data and Information

Packages

PURPOSE: Sample data packages will be developed and will be designed to (1) provide summaries of critical data produced by this study for immediate use by ports and shipper/consignee groups, and (2) serve as a tool in promoting the implementation of the data and information system.



Task 50 - Summary Description of the Integrated Action
Strategy Developed by this Study

PURPOSE: A summary description of all aspects of each strategy area -- an Integrated Action Strategy -- will be developed. The intent of this task will be to outline coordinated steps towards the full-scale implementation of the strategies.

Task 51 - Preparation and Submittal of Draft Report and
Executive Summary

Task 52 - Preparation of Review Materials and Presentation
and Discussion of the Report

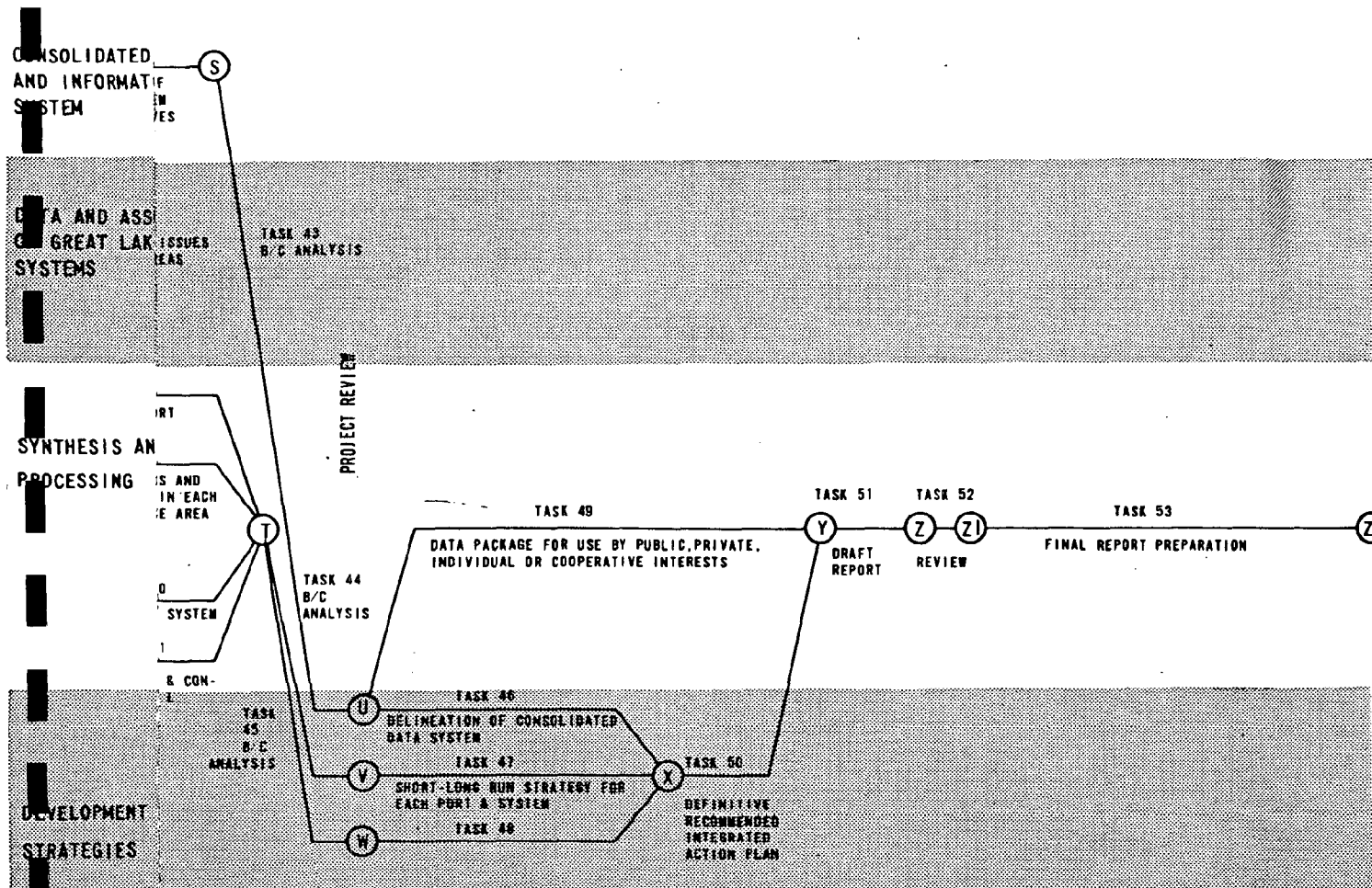
Task 53 - Preparation and Submittal of Final Report



3.3 NETWORK DIAGRAM OF TASKS

The foldout chart which follows illustrates the sequence and interrelationship of study tasks for the life of the entire project. The chart may be read in conjunction with Section 3.2, preceding, which contains detailed descriptions for the study tasks.

STUDY OBJECT	PHASE IV DEVELOPMENT STRATEGY																					
	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70



- | | | | | | |
|---|---|---|----------------------------|--------------------------------------|------------------|
| DATA SYSTEM | 40. BENEFIT COST ANALYSIS OF DATA SYSTEM | 43. DEFINITIVE DATA PACKAGE | 47. INTEGRATED ACTION PLAN | 48. DRAFT REPORT & EXECUTIVE SUMMARY | 50. FINAL REPORT |
| COMMON TION AREAS ENT OF STRATEGIES | 41. BENEFIT COST ANALYSIS OF SHIPPER/ CON-SIGNEES STRA-TEGIES | 44. DEFINITIVE CONSOLIDATED DATA SYSTEM | | | |
| COMMON IS-ON AREAS & OF ALTER-EGIES FOR YSTEM | | 45. DEFINITIVE STRATEGY FOR PORTS EACH AND AS SYSTEM | | | |
| COMMON IS-ON AREAS & OF ALTER-EGIES FOR SIGNEES IN RVICE AREA | | 46. DEFINITIVE STRATEGY FOR SHIPPERS, CONSIGNEES FOR EACH PORT SERVICE AREA AND G.L. SERVICE AREA | | | |
| COMMON IS-ON AREAS & OF ALTER-EGIES FOR IGNEES IN AREA | | | | | |

FIGURE 5

GREAT LAKES COOPERATIVE PORT PLANNING STUDY- NETWORK DIAGRAM OF TASKS

KEY STUDY EVENTS

The capital letters in front of each event are keyed to the lettered circles shown on the network diagram, preceding this page.

		WEEKS FROM START
A	START	0
B	SUGGESTED COTR INTERIM REVIEW*	6
D	SUBMISSION OF DRAFT PHASE I REPORT	12
E	REVIEW BRIEFING OF REPORT	13
F	SUBMISSION OF PHASE I REPORT	15
I	SUGGESTED COTR INTERIM REVIEW*	23
L	SUBMISSION OF DRAFT PHASES I AND II	29
M	REVIEW BRIEFING OF REPORTS	30
N	SUBMISSION OF FINAL PHASE I AND II REPORTS	32
P	SUBMISSION OF DRAFT PHASE III REPORT	42
Q	REVIEW BRIEFING OF PHASE III REPORT	43
R	SUBMISSION OF PHASE III REPORT	45
U	SUGGESTED COTR INTERIM REVIEW*	52
Z	SUBMISSION OF COMPREHENSIVE DRAFT FINAL REPORT AND EXECUTIVE SUMMARY	63
21	REVIEW BRIEFING OF DRAFT REPORT	64
22	SUBMISSION OF FINAL REPORT	72

* These project review sessions are also intended as coordination sessions for interaction and input from the concurrent studies, and are suggested to be run in conjunction with Steering Committee meetings.





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4.0 PROJECT ORGANIZATION AND STAFFING

This section of the proposal describes the way in which Frederic R. Harris, Inc. plans to organize the study team which will carry out and coordinate the many study tasks and inputs from others.

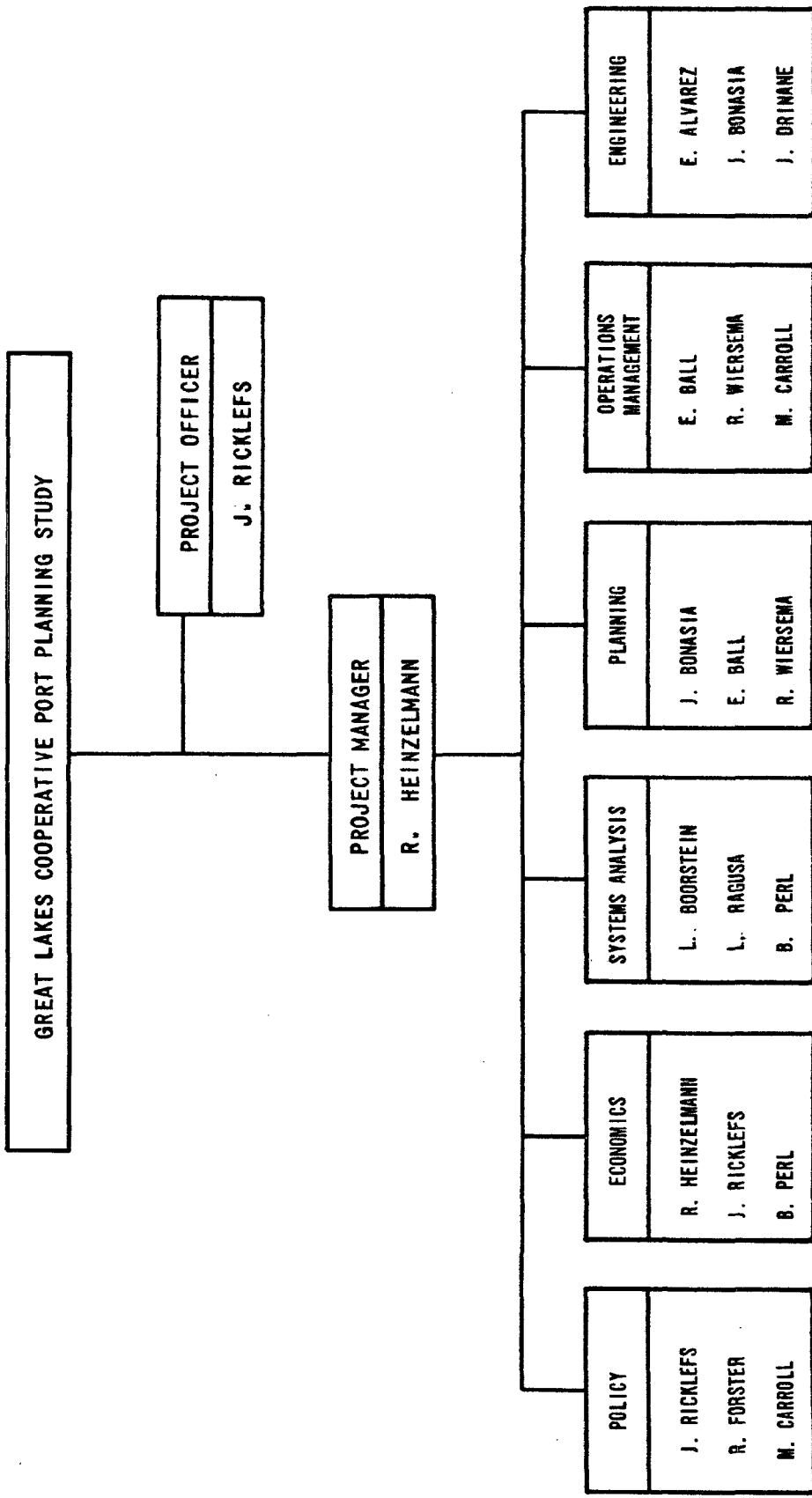
Discussion of study management and coordination is covered in Section 4.1, which includes a Table of Organization showing each major study discipline, along with personnel proposed to carry out the associated functions.

Resumes of key personnel are included in Section 4.2

4.1 STUDY MANAGEMENT AND COORDINATION

The Table of Organization is shown on Figure 6. Several matters are worth pointing out.

Tight management control is afforded by a single Project Manager, who is responsible for the timely completion of all study tasks and the day-to-day conduct of work. For this study, a highly qualified senior transportation economist, Raymond Heinzelmann, will be assigned. Dr. Heinzelmann has extensive experience on commodity movement and port systems.



NOTE: SEVERAL MEMBERS OF THE HARRIS TEAM ARE SHOWN UNDER MORE THAN ONE HEADING. TOTAL TEAM MEMBERSHIP IS 12

FIGURE 6

TABLE OF ORGANIZATION





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A senior Harris Project Officer is in overall charge of the study for Harris. He is in a position in the Company to assure that necessary personnel and other resources can be drawn from the 1,000-person Harris organization to complete the project on time and to client satisfaction. He is in a position to arrange modifications in the study work, if deemed necessary by the management of the Great Lakes Cooperative Port Planning Study, negotiate change orders, etc.

It should be pointed out that the Project Officer on this study, Mr. John Ricklefs, plays a considerable role not only in executive functions but in conduct of key study policy and transportation economics elements. This is an unusual approach for a consulting company; nevertheless, it reflects Harris' actual operating practise, it indicates the importance Harris ascribes to the Great Lakes and it brings to the client the considerable technical expertise of Project Officer who has played a key role in design and conduct of the study methodology.

It should also be pointed out that direct access to the Project Manager by the Great Lakes policy and administrative personnel is provided at all times.



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Harris uses a team approach for tasks. This means that some personnel serve on more than one of the six interdisciplinary teams shown in Figure 6. Harris has found that this multiple assignment management technique provides for better coordination among related tasks, and allows for smoothing of manpower loads over the course of the study.

Harris intends to give specific input coordination assignments to each disciplinary team leader to assure that the coordination provided for by the outline of tasks (see Section 3) is effected. Each of the concurrent studies and inputs by others will be tracked by the Project Manager, analyzed by discipline team leaders, and inputted to the appropriate study element.

Finally, the comprehensive interdisciplinary team which is drawn from the Harris organization should be noted. The team members have worked together before, and all are versed in coordinating among economics, planning and engineering areas, a particular strength of the Harris organization. Harris has found that involving engineering personnel at the earliest phases of comprehensive planning results in plans which are credible and which can be translated into specific designs, if physical facilities are involved.



4.2 RESUMES OF KEY PROPOSED PERSONNEL

The following is a list of the key personnel and their project assignments for the proposed Great Lakes Cooperative Port Planning Study. Resumes for each person follow, in the order listed below:

John E. Ricklefs	Project Officer and Regional Development Specialist
Raymond G. Heinzelmann	Project Manager and Senior Transportation Economist
Richard L. Forster	Senior Advisor - Port Development
Matthew Carroll	Senior Great Lakes Port Development Planner
Barry S. Perl	Transportation Economist
Laurence Boorstein	Senior Systems Analyst
Lawrence Ragusa	Systems Analyst
Joseph J. Bonasia, P.E.	Port Systems Engineer
Ernest Ball	Port Operations Specialist
Richard Wiersema	Land Modes Specialist
Ernest Alvarez, P.E.	Port Engineer
Joseph S. Drinane, P.E.	Port Costing Engineer



PROFESSIONAL HISTORY STATEMENT:

JOHN E. RICKLEFS

PROJECT
ASSIGNMENT

Project Officer and
Regional Development Specialist

QUALIFICATIONS

More than 20 years experience in port systems planning, intermodal transportation economics and regional economic development planning. Coordination and management of complex, multi-participant programs.

EDUCATION

PhM (PhD in process), regional economics, Columbia University; MS, regional economics, University of Belgrade, Yugoslavia; BS, Architecture, Kansas State University; specialized studies in economics, econometrics and sociology.

SELECTED
EXPERIENCE

- Project manager and transportation economist to develop comprehensive, coordinated port development program for the five upstate ports of New York. Users group and government agencies now implementing major recommendations for utilization of ports to promote regional development For the New York State Department of Transportation.
- Project Officer for port feasibility and engineering study for Louisville and Jefferson County (Kentucky) riverport industrial complex.
- Developed basis for unique commodity flows (COMFLO) model to perform comparative cost and rate analyses of shipping routes through alternative terminals.
- Project manager for Somerset County (Maryland) inter-modal port and industrial development study.
- Chief Transportation Economist for Egyptian port systems plan and port relocation study to determine port and intermodal goods movement network to strengthen Egyptian regional economic development. For the Ministry of Housing and Development of Egypt.
- Developed foreign trade commodity demand and other economics aspects of the plan for future development of Mexico's port system. For the World Bank.
- Developed coordinated investment program for the major ports of Iran as part of Iran National Port Study.



PROFESSIONAL HISTORY STATEMENT:

JOHN E. RICKLEFS

Page Two

CAREER HISTORY

Vice President for Development Planning, Frederic R. Harris, Inc., New York (1975 - present)

Project Manager and Regional Economist, Frederic R. Harris, Inc., Caracas, Venezuela (Puerto Cabello development study); Mexico City (Isthmus of Tehnantepec expansion study); Tehran, Iran; New London, Connecticut (port development study) (1974-75)

Transportation Economist and Economic Planner, Frederic R. Harris, Inc., Portland, Maine (Port of Portland economics study); Managua, Nicaragua; New York, New York; Tehran, Iran (1972-1974)

Director of Planning Operations for the community development division of a large development corporation (1971-72)

Director of Planning for an urban design and planning firm in New York City (1969-71)

Research Consultant, Organization for Economic Cooperation and Development (OECD) (1966-69)

Consultant in urban planning in Yugoslavia (1964-66)

Various urban and regional development organizations (1959-64)

Military service, USAD-SAC 1st. Lt. (1957-59)

PUBLICATIONS

(In addition to reports on above mentioned projects)

Gaps in Technology: The Non-Ferrous Metals Industry, Paris, OECD, 1968

The General Report on the Technological Gap, Paris, OECD, 1968

Gaps in Technology: The Analytical Report, Paris, OECD, 1968

The Conditions for Success in Technological Innovation, Paris, OECD, 1969

(Masters Thesis) Integracija Nazadnih Regiona (The Integration of a Backwards Region), University of Belgrade, 1966

PERSONAL

Married, 42 years old



PROFESSIONAL HISTORY STATEMENT: RAYMOND G. HEINZELMANN

PROJECT
ASSIGNMENT

Project Manager and
Senior Transportation Economist

QUALIFICATIONS

Experienced in transportation and distribution economics focusing on changes in cargo movement patterns and models. Specializing in commodity mix and tonnage forecast, port facility and service requirements, regulatory constraints, financial requirements pricing policies and management information systems.

EDUCATION

PhD, business administration, The American University, Washington, D.C.; MBA, marketing and management, New York University; MS, University of New Hampshire; BS, Delaware Valley College

PROFESSIONAL
CERTIFICATION

Interstate Commerce Commission Practitioner

SELECTED
EXPERIENCE

- Completed an economic feasibility study for a new port and industrial park complex for Somerset County, Maryland
- Designed and implemented a management information system for Andrews International (International Freight Forwarder) ocean export operations. Carried-out studies on patterns of U.S. trade to identify market opportunities for their Part IV carrier authority. Carried-out cost studies, alternative routing analysis, and set-up through container systems combining the Part IV authority with NVOCC authority.
- Carried-out port pair analysis between U.S. ports and ports in the middle east for Aspen Steamship Lines.
- Determined economic feasibility of transshipment facilities and interlining of goods between Europe and Indian Ocean, via eastern Mediterranean ports.
- Investigated the market needed for additional tramp tonnage to carry grain to Russia and oil from Alaska for Columbus Circle Line. Projected the capital requirements to acquire ships and set-up the supporting organizational structure. Designed the organizational requirements and the company's profit and loss statement for a five-year period.
- Developed and marketed through transportation systems for consumer goods based around the LASH system for Prudential Lines. This included bringing together warehousing for consolidation setting up shippers' associations and contract truckings.

- continued -



PROFESSIONAL HISTORY STATEMENT:

RAYMOND G. HEINZELMANN

Page Two

SELECTED
EXPERIENCE :
(continued)

- Developed a five-year projection of the market potential for the Inter-City Transportation Company's (Construction Materials Trucking Company) services. Also set-up a five-year plan including marketing, fleet expansion, and management organizational requirements. (1975)

RECENT
CAREER HISTORY

Project Manager and Senior Transportation Economist (Somerset County, Maryland, Industrial Port Complex Study; Louisville and Jefferson County, Kentucky, Riverport Engineering and Feasibility Survey), Frederic R. Harris, Inc., New York (1977 - present)

Assistant Professor of Marketing (international transportation, containerization and intermodal transport, marketing logistics, ocean shipping, physical distribution). Bernard M. Baruch College - City University of New York (1973-77)

Consultant to project manager, "The Inland Origin and Destination of Trans-Atlantic Freight Movements Between United States/Canadian and Western European Cities -- to 1985." Also involved in the project design, data collection and marketing of the study. (1971-1973)

PROFESSIONAL
PUBLICATIONS

"Changing Trade Patterns of U.S. Ocean Liner Cargo", 1974

"Evaluation of the Domestic Air Cargo Market", 1972

MEMBERSHIPS

American Society of Traffic and Transportation
National Council of Physical Distribution Management
National Committee on International Trade Documentation
Containerization Institute

PERSONAL

Married, 42 years old



PROFESSIONAL HISTORY STATEMENT: RICHARD L. FORSTER

PROJECT
ASSIGNMENT

Senior Advisor - Port Development

QUALIFICATIONS

One of the foremost world experts in multi-modal transportation planning with over 28 years experience in the development of port systems, port planning and operations, shipping technology applications, distribution, revenue bond financing feasibility studies, industrial development, waterfront industrial parks and course-of-action studies.

EDUCATION

Business administration major, Wichita State University, Kansas

SELECTED
EXPERIENCE

- Supervised comprehensive study for New York State Department of Transportation of five upstate ports to establish commerce potential for each port, determine economic contribution to hinterlands, establish facilities and service requirements, prepare land-use and physical development plans, recommend organization, operating and financial structures, and develop marketing strategies.
- Study for the Maritime Administration, for port collection and separation facilities for oily water wastes from ships and commercial vessels at U.S. Coastal Ports, Great Lakes ports, and on the Inland Waterways.
- Plan to incorporate waterborne movement into the intermodal transport of ore products from upstate New York mines to various domestic and international markets to reduce costs. Development of plans for the shipping system, port facilities, and intermodal transfers.
- Long range plan for the Port of Rotterdam, Netherlands, the deep-water gateway port serving the European Common Market and the European Free Trade countries of Northwest Europe. Included projection of industrial development potential and related infrastructure requirements from Rotterdam to the Belgian Border.
- Nationwide port planning studies for the governments of Iran and of Mexico, including the inland transportation service network and supporting urban infrastructure.
- Plan for expansion of the Port of Pascagoula, Mississippi, to include a bulk handling port and upland facility.



PROFESSIONAL HISTORY STATEMENT:

RICHARD L. FORSTER

Page Two

- Modernization study for the fish pier complex for the Port of Boston, Massachusetts, including related requirements for the modernization of fishing industry practices.
- Plan for the Mystic Pier Containerport in the Port of Boston.
- Developed transportation alternatives for shipment of products from a proposed new petrochemical complex in the Middle East to worldwide destinations.
- Study of cargo movements by all transportation modes in Jacksonville (Florida). Included modal volumes, movement patterns, linkages and terminal facilities.
- Course-of-action study for the Connecticut Department of Transportation for future use of the state-owned pier at New London.
- Feasibility study of passenger/car ferry service between Southern Florida and the Yucatan Peninsula in Mexico.
- Long range planning and economic feasibility for the further development and expansion of the Port of Pensacola, Florida.

CAREER HISTORY

Advisor in Port Development Planning (1976 - present)

Senior Vice President and Director of Planning, Frederic R. Harris, Inc., New York (1964 - 76)

General Planning Consultant and Manager of Facilities, Community and Industrial Planning, Ebasco Services, Inc., New York (1947 - 64)

Instructor - Lecturer in Business Management, New York University (1946 - 51)

Office and Facilities Manager, Atlantic Division, Pan American World Airways (1941 - 47)

President, own commercial travel agency (1939 - 40)

Assistant to General Manager, Santa Fe Trail Transportation Co., Wichita, Kansas (1933 - 39)

- continued -



PROFESSIONAL HISTORY STATEMENT:

RICHARD L. FORSTER

Page Three

MEMBERSHIPS

American Economic Association
American Industrial Development Council
American Society of Planning Officials
American Association of Port Authorities
Urban Land Institute
PIANC (Permanent International Association of
Navigation Congresses)

PROFESSIONAL
RECOGNITION

Member National Panel of Arbitrators, American Arbitration
Association, Listed in Who's Who in the East, Who's Who in
Finance and Industry, Dictionary of International Biography,
and Men of Achievement, 1973-4.



PROFESSIONAL HISTORY STATEMENT: MATTHEW CARROLL

PROJECT
ASSIGNMENT

Senior Great Lakes Port Development Planner

QUALIFICATIONS

More than 30 years experience in all phases of port planning, physical layouts, port management and marine and terminal operations including five years on the Great Lakes and as Director of International Association of Great Lakes Ports. Coordination of agencies, integrated transportation operations and planning.

EDUCATION

BS, United States Merchant Marine Academy; specialized studies in transportation and business administration, Georgetown University and New York University

SELECTED
EXPERIENCE

- Preparation of master plan for relocation of port and port facilities in Port Said, Egypt, and on rehabilitation and modernization of existing general cargo facilities.
- General manager of the Port of Buffalo. Accomplishments: four years of record income, elimination of annual port deficits during last two years, major new construction program.
- Planned and supervised study to determine adequacy of port facilities operation in relation to physical layout for Port of New York/New Jersey.
- Formed port users group and maritime council, with officers elected by users, for Port of Buffalo and initiated new program for marketing and public relations.
- Recommended an improved layout for marine terminals of the Port of New York/New Jersey based on analysis of steamship and connecting overland carrier operations.
- Coordinated Port of New York/New Jersey interests with the U.S. Army Corps of Engineers and maintained continuing liaison with other ports to develop a cooperative solution to port problems.
- Renewed and executed new leases on 600,000 square feet of port facilities.
- Created 200 acres of productive upland from dredged spoils disposal area, and built new road and waterfront dike from salvaged road materials.
- Revised port tariff and negotiated new stevedore agreement.



PROFESSIONAL HISTORY STATEMENT:

MATTHEW CARROLL

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CAREER
HISTORY

Port Development Specialist, regional port planning and port operations evaluation, Frederic R. Harris, Inc., New York (1977-present)

General Manager, Port of Buffalo (1972-1977)

Supervising Transportation Planner, Senior Transportation Planner and Marine Terminals Analyst, Port of New York/New Jersey Authority (1960-63)

- Increasing responsibility in the conduct of planning for optimized marine operations in relation to master planning of marine facilities, including extensive analysis of transportation technology, intermodal commodity movements and marine and terminal operations

Assistant Director of Engineering, Grace Lines, New York. Responsible for all technical operational phasis of construction for new container, passenger and general cargo vessels, specifications, bids and contracts. Coordinated container cargo operations with Freight Traffic Department. Represented Grace Lines at interagency meetings. (1960-63)

Staff consultant, Drake Startzman, Sheahan and Barclay, New York (1959-60)

Assistant to President, Stephen Ramson, Inc., New York, including administration, general operations, customer relations and coordination of all ship repair facilities and five years as Supervisory Engineer (1950-59).

Marine engineer with various steamship companies. Chief Engineer license. (1944-50)

PUBLICATIONS

Marine News - 1960 - Ship Maintenance Program
Society of Naval Architects Marine Engineers - 1965.
Relation of Ships to their Terminals
Society of Marine Port Engineers - 1965, Partners in Progress (sponsored by the Port Authority of New York)

- continued -



HARRIS

PROFESSIONAL HISTORY STATEMENT:

MATTHEW CARROLL

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PROFESSIONAL
MEMBERSHIPS

Society of Naval Architects and Marine Engineers
Society of Marine Port Engineers
American Association of Port Authorities
Director, Secretary Committee II, Special
Representative to Society of Naval Architects
and National Standards Institute, Committee of
Container Standards
North Atlantic Ports Association - Navigation
and Harbor Committee
Buffalo Chamber of Commerce - Vice Chairman of
Transportation committee

PERSONAL

Single, 55 years old



PROFESSIONAL HISTORY STATEMENT: BARRY S. PERL

PROJECT
ASSIGNMENT

Transportation Economist

QUALIFICATIONS

Experienced in national and international commodity flow least cost transportation analysis and forecasting, economic development research, and environmental evaluation.

EDUCATION

MS in process, international marketing and transportation, Baruch College, City University of New York; BA, economics, sociology and urban planning, Brooklyn College, City University of New York. Specialized studies in computer programming, marketing, management, statistics, accounting and finance.

SELECTED
EXPERIENCE

- Compilation of costs of commodity transport through a proposed inland U.S. revenue port complex to domestic and foreign consignees
- Test of alternative transportation modes to find least cost alternatives through a proposed inland port
- Analyzed development impact of Verrazano-Narrows bridge on growth of Staten Island economy and transportation link improvement impact on regional economy
- Evaluated socio-economic effects and legal and institutional implications of transportation improvements on growth of business and transportation facilities
- Greenbelt and environmental impact assessment
- Coordinated inputs from local planning agencies, interviewed officials and maintained two-way communications between participants in a development study

RECENT
CAREER HISTORY

Transportation economist, Frederic R. Harris, Inc., New York (1977 - present)

Cost estimator, Joseph Weinstein Electric Corporation, New York (1976-77)

Purchasing agent, Meter Measure Corporation, Los Angeles (1975-76)



PROFESSIONAL HISTORY STATEMENT:

BARRY S. PERL
Page Two

PROFESSIONAL
ACTIVITIES

- Economics Society - Officer
- Urban Affairs Club - Officer

PERSONAL

Single, 24 years old, excellent health



PROFESSIONAL HISTORY STATEMENT:

LAURENCE BOORSTEIN

PROJECT
ASSIGNMENT

Senior Systems Analyst

QUALIFICATIONS

Experienced in computer systems, modeling and simulation of complex transportation networks, consolidated data systems and information processing.

EDUCATION

MSCE, Columbia University; BA, Columbia College.
Specialized graduate studies in linear programming.

SELECTED
EXPERIENCE

- Designed computer based forecasting system for cargo flow data and port facility capacities for proposed Louisville riverport and industrial complex engineering and feasibility study.
- Developed intermodal transportation systems simulation program for Delmarva peninsula (Delaware/Maryland) regional ports, including marine and inland waterborne and rail/truck segments of alternative shipping routes.
- Constructed a utility program to develop a data base of existing and potential cargo routings through upstate New York ports from records of shippers and consignees in the regional market area.
- Used transportation systems program with shipping data base to simulate performance, in terms of shipping costs, cargo volumes and benefits to shippers of upstate ports and the regional ports system under alternative routings of potential cargoes and reroutings of existing commodity flows, which were selected automatically to minimize costs thereby projecting future cargo throughputs for various facilities. Delineated boundaries of preferential port market areas for each commodity class. Determined market marginality sensitivity of cargo routings to incremental changes in costs of alternative routings and service frequency constraints, by variation of model parameters, and evaluated interactions of ports in the regional system under alternative cost levels in each port.
- Simulated future financial performance of the port authorities of Albany, Buffalo, Rochester and other upstate ports with projected throughputs. Tested sensitivity of financial performance to different throughputs possible under various levels of investment in new facilities. Validated financial models simulating historical, financial performances of the ports.



- Simulated a middle eastern port traffic system to compare alternative port location sites for lease total transportation cost optimization.
- Developed computerized process interaction for a shore-side forest products shipping terminal.
- Developed computer program modules for GPSS V simulation of a crude oil trans-shipment terminal. The program applies multi-server theory to the utilization of berths, lines and tanks to evaluate performance of terminal under alternative operating procedures and with and without selected facilities.
- Performed benefit/cost analysis of alternative investments in proposed bulk and container cargo handling facilities and evaluated sensitivity of these analyses to capital opportunity cost levels.

CAREER HISTORY

Senior Systems Analyst, Frederic R. Harris, New York
(1976 - present)

Systems Analyst, Frederic R. Harris, Inc., New York
(1975)

Structural Designer, Frederic R. Harris, Inc., New York
(1973 - 74)

MEMBERSHIPS

American Society of Civil Engineers
American Concrete Institute
Association of Computing Machinery

PERSONAL

Married, 27 years old



PROFESSIONAL HISTORY STATEMENT:

LAWRENCE RAGUSA

PROJECT
ASSIGNMENT

Systems Analyst

QUALIFICATIONS

Experienced in numerical and in scientific methods, creating systems for analyses of ship market availability, port design sensitivity.

EDUCATION

BS, Mathematics, St. John's University

SELECTED
EXPERIENCE

- Performed a specification sensitivity analysis for the proposed construction of a new graving dock for the Savannah Machine and Shipyard Company. Provided evaluation of the marginal effect of incremental changes in design parameters on ship market availability. Developed methods of analyses and their corresponding computer programs. Analyzed, charter, and graphed the resultant output. Programs were developed to select worldwide vessel population, as well as specific nearby port markets and tabulated ship population versus varying design criteria.
- Designed system and programmed a comprehensive search analysis of ship market and investigated characteristics of ship criteria and population for various proposed harbor facilities.
- Developed system of scientific programs for use in design of an offshore nuclear power plant for Public Service Electric and Gas Company of New Jersey.
- Created system of graphics routines that were used in analyzing output. Output was graphed on an in-house interactive graphics computer terminal.
- Responsible for maintaining computer capabilities, programs and their documentations.
- Developed mathematical programs, utilizing various numerical analysis methods, to solve systems of equations and polynomials.

RECENT
CAREER HISTORY

Mathematician, F.R. Harris (1974 - present)

PERSONAL

Single, 25 years old



PROFESSIONAL HISTORY STATEMENT:

JOSEPH J. BONASIA, P.E.

PROJECT
ASSIGNMENT

Port Systems Engineer

QUALIFICATIONS

More than 20 years experience in port systems planning and engineering, offshore engineering and structural design. Specialized in complex engineering and planning assignments where a high degree of coordination among geographically dispersed elements is required.

EDUCATION

MCE, Brooklyn Polytechnic Institute; BCE Brooklyn Polytechnic Institute

SELECTED
EXPERIENCE

- Analyzed capability of five upstate New York public ports to handle potential commerce, and evaluated navigation systems on the Hudson River, Great Lakes and St. Lawrence Seaway.
- Developed port planning criteria which included engineering and environmental impacts and prepared master development plans for the five ports.
 - Master plan for Port of Albany included the addition of a mineral bulk handling facility and a container handling facility to the port.
 - Plan for Port of Buffalo included development layout for handling of 7.5 million tons of coal and .6 million tons of other bulk material.
 - Plan for Port of Ogdensburg included development for increased general cargo and bulk material thruput.
 - Plans for Port of Oswego included development for a 300,000 ton coal handling facility.
 - Plans for Port of Rochester included development of a RO/RO facility.
- Surveyed navigation problems on Great Lakes and tributary rivers, observing operations and constraints of locks. Familiar with locks, operations, traffic conditions on the Great Lakes.
- Designed breakwater for small boat harbor at Dunkirk on Lake Erie for U.S. Army Corps of Engineers, Buffalo District.

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PROFESSIONAL HISTORY STATEMENT:

JOSEPH J. BONASIA, P.E.

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SELECTED
EXPERIENCED
(continued)

- Planned and performed preliminary engineering for a port complex to handle bagged and bulk cement, container, RO/RO and general cargo. Established basic criteria and layout for container handling complex. Developed organizational and staffing structure to control, manage, operate and maintain port complex.
- Engineered 75 acre, five berth marine container RO/RO terminal including marginal wharf, roads, sheds, railroads, and creation of 37 acres of new land.
- Completed landmark NSF study on ways to assess onshore impacts of offshore energy and related developments (Project Manager).
- Completed a study to evaluate feasibility of artificial, manmade industrial port islands located off the U.S. Atlantic and Gulf Coasts.

CAREER HISTORY

Principal Engineer, Frederic R. Harris, Inc., New York Port
(1963 - present)

Structural Designer, on-shore pier facilities, Praeger-Kavanagh-Waterbury, New York (1961-63)

Structural designer and project supervisor, Lockwood, Kessler & Bartlett, Syosset, New York (1956-61)

Structural designer, D.B. Steinman, New York (1953-56)

MEMBERSHIPS

American Society of Civil Engineers

PUBLICATIONS

"Artificial Islands for Industrial Ports", Water Spectrum, U.S. Army Corps of Engineers, Fall 1975.

"Evaluation of Multi-Purpose Industrial Port Islands: Sea Island Structure Engineering Research Study", Offshore Technology Conference, May, 1976. OTC Paper #2336.

PERSONAL

Married, 47 years old



PROFESSIONAL HISTORY STATEMENT: ERNEST BALL

PROJECT .. Port Operations Specialist
ASSIGNMENT

QUALIFICATIONS More than 25 years in port planning and marine terminal location and operation, with experience in warehousing, physical distribution, operating, labor and financial considerations. Knowledge of commodity and cargo movements, establishment and negotiation of rates, tariffs, and profitability factors. Experienced operator of containerized, dry bulk, and liquid bulk marine terminal facilities.

EDUCATION Graduate studies in business administration, Columbia University and Amos Tuck School; BA, Dartmouth College

SELECTED
EXPERIENCE

- Responsible for operations, sales and profitability of major U.S. Gulf Coast bulk marine terminal, and for preparation of expansion and development program for the facility.
- Developed Mathematical Planning Technique for determining Port & Berth Capacity by commodity type, relating annual volume to desired waiting time. System is compatible with graphic and computerized presentation, facilitating use in port planning.
- Developed computerized system for determining optimum transit shed size as related to traffic pattern and free time policy (1973).
- Prepared recommendations for the rehabilitation and modernization of existing facilities at Port Said, Egypt.
- Established operating requirements, berth and transportation layout for 20 berth Persian Gulf port and surroundings. Prepared port operations analysis for recommended future operations.
- Calculated port capacities and projected berth requirements for all major Iranian ports. Prepared recommended operating practices, port organization, and equipment requirements for the 15 year period. Prepared cost and financial forecast data for return on investment analysis and for computerized foreign trade model.
- Prepared technical specifications and operating requirements, comparative rate analysis, recommended tariff rates, and prepared financial analysis of operating results for a crude oil transshipment terminal.
- Developed port traffic data collection system for Ports of Iran, and prepared manual for implementation.



- Developed plan and determined economic feasibility for Scrap Metal Loading facility, Chesapeake, Virginia (now under construction).
- Planned, developed and placed in operation, fastest (in US) export bagging and shiploading facility for fertilizer industry, Chesapeake, Virginia.
- Planned, determined economic viability, and developed high capacity barge transfer and shiploading facility for phosphate rock and phosphate products.
- Arranged establishment of Marine Terminal Association, under U.S. Federal Maritime Commission regulations, for Port of Norfolk, Virginia. Presided over development of port tariff.
- Represented Virginia Ports at Federal Maritime, Interstate Commerce Commission and U.S. Department of Labor hearings.

CAREER HISTORY

Senior Port Operations Specialist, Frederic R. Harris, New York (1977 - present)

Member, U.S.A.I.D. war damage assessment team of Port of Beirut, Lebanon (1977)

Managing Director, Burnside Terminal, Burnside, Louisiana (1975-76)

Consultant, Burmah Oil Tankers, Ltd., New York (1975)

Export Technical Advisor to General Manager of Port of Alexandria, Egypt, for port operations and management, for U.S.A.I.D. (1975)

Senior Port Operations Specialist, Iran ports master plan (1972-74)

Management and Operating Experience: (1952 - 1971)

President, Elizabeth River Terminals, Inc., Norfolk, Virginia and its trucking and liquid commodity storage facility, Chemical Storage & Transport corp. Also Chairman of Norfolk Marine Terminal Association and Middle Atlantic Ports Dockage Association.

President, Seacor, Inc., Wilmington, North Carolina - marine terminal operators and port developers, and its subsidiary, Almont Shipping Co.



PROFESSIONAL HISTORY STATEMENT:

ERNEST BALL
Page Three

CAREER HISTORY
(continued)

Manager, O.T.D. Terminals, Inc. and Operations Director,
Custom Distribution Services, Inc., Perth Amboy,
New Jersey

PERSONAL

Married, 55 years old



PROFESSIONAL HISTORY STATEMENT: RICHARD H. WIERSEMA

PROJECT
ASSIGNMENT

Land Modes Specialist

QUALIFICATIONS

Twenty years experience in freight and traffic improvement programs; railroad systems analysis, planning, economics, operations and cost analysis; intermodal transportation studies; market and commodity flow analysis; rate and route analysis.

EDUCATION

MBA, transportation, Northwestern University; Cert. Trans., Transportation Center, Northwestern University; BBA, University of Cincinnati

SELECTED
EXPERIENCE

- Developed a network of coordinated rail-highway services utilizing independent motor carriers as feeders to the rail system.
- Designed and implemented ICG intermodal management information system utilizing instantaneous display equipment and techniques.
- Studies of urban railroad relocation and cost/benefit analysis.
- Developed passenger marketing programs for a major rail carrier.
- Prepared five and ten year plans for railroad development including major investment requirements and projections of future rail services demand.
- Development of future market demand for rail services by geographic area, commodities and major origin-destination pairs.
- Developed and utilized procedures for locating new intermodal facilities considering customer locations vs capital and operating expense.
- Managed tank-car fleet of approximately 1,000 cars.
- Established sales forecasting for use in estimating future car demand.
- Managed all traffic functions for three plants including two shipping largely in less-than-truckload quantities.

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PROFESSIONAL HISTORY STATEMENT: RICHARD H. WIERSEMA

CAREER HISTORY

Principal, PRC Railway Systems, McClean, Virginia
(1977 - present)

Manager Corporate Planning, Illinois Central Gulf
Railroad Company, Chicago (1967-77)

Transportation Engineer, U.S. Steel Corporation,
Pittsburgh (1958-67)

First Lieutenant, U.S. Air Force (1953-57)

PUBLICATIONS

"Computer Control of the Intermodal Terminal", Rail
International, Dec. 1970. Presented to the International
Railway Congress, London, 1971

"The Intermodal Interface: presented at the United
Engineering Foundation Conference on Urban Goods Movement,
August, 1974.

"Improving the Intermodal Interface" presented at the
University of California-San Diego Seminar "Transportation
in the Seventies", May, 1969.

MEMBERSHIPS

Transportation Research Forum

PERSONAL

48 years old



PROFESSIONAL HISTORY STATEMENT: ERNEST ALVAREZ, P.E.

PROJECT
ASSIGNMENT

Port Engineer

QUALIFICATIONS

More than 20 years experience in engineering design, feasibility and economic studies of ports, terminals, offshore structures, highway and other transportation facilities.

EDUCATION

BCE, Polytechnic Institute of Brooklyn; Graduate studies at Columbia University and Alexander Hamilton Institute.

SELECTED
EXPERIENCE

- Project Engineer on the design of two marine terminals for LNG in Chile, at Cabo Negro and Quintero; for 125,000 M3 carriers.
- Developed conceptual designs for a lime mud slurry transportation system consisting of dredging, pipelining, storage and marine terminal.
- In charge of review of design, evaluation of construction, and survey of port operations for San Vicente Port, Chile.
- Designed protective structures for selected floating nuclear power plants offshore sites.
- Design for expansion and rehabilitation of Port of Haina, Dominican Republic. Modernization consists of two container berths, one cargo berth, three RO/RO platforms, transit sheds, marshalling areas and port buildings.
- Project Coordinator in charge of preliminary engineering design of a common-user oil terminal located in the Strait of Canso, Nova Scotia.
- Project Manager in charge of an economic and engineering feasibility study for deepwater oil terminal facilities for the Port of Los Angeles.
- Managed a marine terminal feasibility and basic engineering design to permit careful assessment of environmental impact of proposed facilities.
- Performed an economic-technical feasibility study and preliminary engineering for a new proposed oil terminal for Karachi, West Pakistan.

- continued -



PROFESSIONAL HISTORY STATEMENT: ERNEST ALVAREZ, P.E.
Page Two

SELECTED
EXPERIENCE
(continued)

- Project Manager in charge of the Lake Pontchartrain Hurricane Barrier Plan, Louisiana.
- Project Engineer for the construction of the super tanker crude oil loading and storage terminal located in Venice, Louisiana.
- Deputy Project Director in charge of an investigation and report covering transportation corridors, including roads, waterways and seaports for an economic feasibility study in Liberia, West Africa.
- Civil Engineer and Designer of the design analysis for:

Breakwater and bulk loading pier in Newfoundland
Small Craft Harbor in Kharg Island, Iran
Wharf facilities for a crude oil loading terminal in Martinez, CA.
Offshore mammoth tanker mooring device located in Libya
Development of an Offshore multi-leg mooring system

CAREER HISTORY

Project Manager and Assistant Vice President, Frederic R. Harris, Inc., USA and overseas (1960 - present)

Soils Engineer, Hardesty & Hanover, New York (1960)

Engineer, Moran, Proctor, Muesser & Rutledge, New York (1958 - 59)

Engineer Analyst, Dames & Moore, New York (1955, 1957 - 58)

First Lieutenant, U.S. Army Corps of Engineers (1955 - 57)

MEMBERSHIPS

American Society of Civil Engineers
National Society of Professional Engineers
Society of American Military Engineers
International Society of Soil Mechanics and Foundation Engineers

PERSONAL

Married, 46 years old



PROFESSIONAL HISTORY STATEMENT: JOSEPH S. DRINANE, P.E.

PROJECT
ASSIGNMENT

Port Costing Engineer

QUALIFICATIONS

More than 30 years experience in port facility cost engineering, construction engineering, and cost estimating on all types of projects.

EDUCATION

Graduate, LaSalle Military Academy, BS, architectural engineering, University of Notre Dame

SELECTED
EXPERIENCE

• Cost engineering on following projects:

LNG Terminal - Cabo Negro, Chile for ENAP
LNG/LPG Terminal - Quintero, Chile for ENAP
Massport, Terminal Buildings - Boston, Massachusetts
Portable Ports - U.S. Navy
Oil Terminal - Cherry Point, Washington
Karachi Oil Terminal - Pakistan
Submarine Pipelines - Trinidad
Oil Terminal - Singapore
Breakwater - Karachi
Offshore Nuclear Power Plant - New Jersey
Aramco Oil Terminal - Saudi Arabia
Drydock Bid Analysis - Iran
Construction Graving Dock - Jacksonville, Florida
Marine Transshipment Terminal - Bahamas
Offshore Power System Development

• Prepared engineering and construction estimates, construction equipment requirements and procurement of equipment and materials for complex projects. Made studies of construction methods, time and progress to advise clients on order of procedures and time involved for multiple contract projects. Some of these projects were:

Rehabilitation of Jetties 1 to 6, Chittagong, East Pakistan
Proposed Drydock, Callao, Peru
Airport - Managua, Nicaragua
Gulf Oil Terminal, Bantry Bay, Ireland
Proposed Highway Program, Malaysia
Oil Terminals: Point Tupper, Nova Scotia
 Come-By-Chance, Newfoundland
 Kharg Island, Iran
Container Port: Staten Island, Iran
 Boston, Massachusetts
Slurry Trench Construction, New Orleans, La.
Drydock, Mobile, Alabama
Tanker Berth, Virgin Islands
Various Sections of the Garden State Parkway



PROFESSIONAL HISTORY STATEMENT:

JOSEPH S. DRINANE, P.E.

Page Two

CAREER HISTORY

Cost Engineer, Frederick R. Harris, Inc., New York
(1970 - present)

Chief Construction Engineer, Frederic R. Harris, Inc.,
New York (1967 - 69)

President, Drinane & Peterson Corporation, Englewood,
New Jersey (1963 - 67)

Chief Engineer, Elmhurst Construction Co., Corona,
New York (1944 - 63)

Chief Estimator, Pan American Airways, New York (1942 - 44)

Assistant Chief Engineer, George M. Brewster & Sons,
Bogota, New Jersey (1935 - 42)

Resident Engineer, New Jersey approach to George Washington
Bridge and state highways in New Jersey and Pennsylvania

MEMBERSHIPS

Association of General Contractors (former Director)

National Society of Professional Engineers

Society of American Military Engineers

Moles



4.3 PERCENTAGE OF OFFERER'S WORK WEEK

The percentage of time to be devoted to each study

PHASE by the personnel is shown in the table below:

PERSONNEL	PHASES			
	I	II	III	IV
	Percentage of Average Work Week			
J. Ricklefs	40	40	40	60
R. Heinzelmann	60	60	60	40
R. Forster	15	15	15	25
M. Carroll	-	-	52	42
B. Perl	95	90	100	95
L. Boorstein	95	60	80	80
L. Ragusa	75	30	40	20
J. Bonasia	15	50	-	15
E. Ball	-	25	-	15
R. Wiersema	20	-	-	15
E. Alvarez	-	-	15	-
J. Drinane	-	-	15	10
Draftsman	-	20	25	15

SECTION 5



5.0 ABILITY TO PERFORM

Frederic R. Harris, Inc. has 50 years experience in the complete evaluation, planning and design of regional port systems. Harris' success in this field stems from a unique balance of planning and engineering experience, which enables it to blend social, economic, land use and transportation planning considerations with practical engineering. Port plans developed in coordination with engineering personnel result in systems that have credibility.

Harris has world-wide experience in the engineering design of ports, harbors, related marine structures and navigation improvements: massive and small piers, wharves and harbor works; the transformation of exposed coastline into protected deepwater harbors; rehabilitation and modernization of deteriorated waterfronts.

Nine-tenths of a billion dollars of port and harbor works have been constructed in accord with Harris' plans and specifications.

Harris is in the forefront of A/E firms with strong in-house capabilities in regional planning, market research,



economic and financial analysis and the environmental ramifications of marine-related activities.

Every project undertaken by Harris can call upon the competence and skills of some 1,000 technical support personnel in 24 permanent offices throughout the United States and abroad.

5.1 RELEVANT EXPERIENCE

The small selection of Harris studies and engineering projects which follows indicates the range of prior experience related to diverse aspects of the Great Lakes Cooperative Port Planning Study.



PORT SYSTEMS PLANNING

Comprehensive Upstate New York Port Study

A statewide study of five upstate New York ports: Albany, Buffalo, Ogdensburg, Oswego and Rochester. The study presented firm conclusions in three interrelated areas:

1. Coordinated port development - identified specialized service, equipment, and facility needs for effective handling of existing and potential freight traffic;
2. Financing - defined the appropriate level of charges, regional economic benefit and level of public financial support and distribution of cost of this support among state and local governments, and
3. Port Management - defined the organizational structure and staffing patterns that will most effectively meet the requirements of present and future port operations.

As a direct result of this study, the following actions have been taken:

- a. An independent Upstate Ports Council has been formed and already achieved significant results in facilities planning, coordinated marketing, and the adjustment of port charges;
- b. A Users (Shippers/Consignees) Association has been formed and embarked upon a program aimed at achieving the lowest possible transport costs for members' goods by, where appropriate, shipping through an upstate port;
- c. In four out of the five cases, the Port Authorities have officially commended and adopted the development program and plans presented in the reports; and
- d. The N.Y. State D.O.T. together with the Upstate Ports Council have begun the process for establishing the mechanism whereby specific portions of the study can be "rerun" on an annual basis.

Client: New York State Department of Transportation



National Ports Study for Mexico

The study was conducted in two phases:

Phase I consisted of the preparation of a long-term master plan for a system of 14 ports based on import and export projections over the next 25 years and upon traffic assignments based on minimum total distribution costs. Evaluation was made of the plans and forecasts of investment costs, revenues and economic benefits.

Phase II consisted of the preparation of specific feasibility studies of high priority projects identified in the master plan. Two ports which were a part of the second phase of the study were Vera Cruz and Tampico.

Client: Ministry of Public Works, Mexico

National Ports Study for Iran

Adibi-Harris Associates, Tehran, a coordinated investment program for the Ports of Iran.

In order to recommend such a program, Adibi-Harris analyzed and reviewed existing facilities including those under construction. It established a development program for ports to handle traffic through 1366 a.h. (after Hegira/1987 A.D.). The study also included a master plan for future long range harbor development in the priority ports on the Persian Gulf and on the Caspian Sea and feasibility studies as the first step toward such developments. The feasibility studies included preliminary engineering designs and cost estimates, an economic analysis of proposed investments for all ports and a financial analysis of future non-military port operations.

Client: Iran Ports and Shipping Organization

Rotterdam, The Netherlands

Appraisal and recommendations for the world's largest port in terms of its administration and development from the present through the year 2000. Included a review of the physical, financial, constitutional and economic aspects of the Port of Rotterdam in relation to future port development within the entire Greater Delta Region.

Client: Port of Rotterdam



HARRIS

LEAST COST COMMODITY ROUTING ANALYSIS IN SUPPORT
OF NEW TERMINAL LOCATIONS

Course-of-Action Study for Port of Buffalo, New York

The Upstate Port Study, mentioned previously, made a recommendation for a major bulk-coal transshipment terminal at the eastern end of Lake Erie at the Port of Buffalo to provide the missing link in future large-scale shipments of inexpensive low-sulfur coal from the western part of the United States. In the aim of realizing this recommendation, Harris was hired by the Port of Buffalo to examine all aspects of this coal movement and related terminal operation in order to provide performance standards for potential turn-key developers. The study delineated the total transportation costs of coal from the mines to New York State utilities via several alternative routings.

This was done in order to define the competitive advantages of the proposed Buffalo terminal. The study also defined the financial pro-forma and port-charge schedules related to the operations of the terminal. It also recommended the optimum site.

Client: Niagara Frontier Transportation Authority

Somerset County Industrial Port Complex Study, Maryland

Harris investigated the feasibility of a new port and industrial complex on the eastern shore of Chesapeake Bay in Maryland. As part of the study, all routing patterns and multi-modal goods movements within the region were studied to identify those commodities which could be diverted through the new port at a cost savings to regional shippers and consignees. The study also examined feasible industrial expansion potential related to those goods movements. Port industrial complex alternatives were developed and environmental, economic and social impacts were assessed. The optimum alternative development was identified. The study also provides for a step-by-step implementation program for the recommended alternative.

Client: U.S. Economic Development Administration and
the Somerset County Maritime Industrial Development
Commission



PORT FEASIBILITY STUDIES

Port of Albany Dry Bulk Feasibility Study

The study demonstrated the feasibility of creating a dry bulk shipping and receiving terminal in the Port of Albany. As part of the overall project, Harris analyzed existing flows, projected expansion of these flows, as well as new flows that would result if the terminal were constructed. Four sites were considered along the Hudson River. Financial analyses reflecting transportation costs as well as construction costs were made for each site.

Client: New York State Department of Transportation



HARRIS

COMMODITY FORECASTS FOR PORT MASTER PLANNING

Egypt Ports Study

Harris is developing traffic forecasts which include a comprehensive analysis of all modes of the Egyptian foreign trade transportation and delivery system. This analysis will:

- Define market areas
- Delineate service specifications and development programs
- Diagnose other non-port-site related problems areas which could improve service and reduce total transportation costs
- Define transportation cost criteria for the location of foreign-trade intensive industries
- Define economic benefits resulting from port development and provide firm criteria for the evaluation of port-development feasibility
- Define a firm nationwide coordinated port development policy.

Depending upon the forecasts developed and the data collected concerning shipping trends and expected local operating practices, planning criteria will be established to guide master-plan development and compare possible alternative development schemes.



DEVELOPMENT OF THE APPROPRIATE ROLES FOR PORTS

Port Manatee, Florida

This was a new port to co-exist with the Port of Tampa in the Tampa Bay area. The study identified specific commodity flows to support a revenue bond financing prior to building the port. The financing was successful, the port was built, the projected commerce was secured, and the port has since expanded its facilities.

Port of Jacksonville, Florida

A series of studies for the Jacksonville Port Authority dealt first with the improvement of the Talleyrand Docks -- including a container facility -- followed by development of a new location on Blount Island for bulk handling.

New London, Connecticut

This study was to determine the course of action which the state should follow with respect to the State Pier. Market studies have identified potentials for an expanded facility to handle commodities not now being serviced and which would save industries within a 100 mile radius of the port nearly a million dollars a year.

Pascagoula, Mississippi

A feasibility study investigated the potential for development of a dry-bulk port for certain specialized commodities. The plan as proposed was found not feasible; however, a market analysis did develop potentials for a port with a different commodity mix, and the program for implementation was adopted.



The Ports of Canaveral, Palm Beach, Port Everglades,
and Pensacola, Florida

The studies for each of these ports were similar in that each had been in existence for a considerable period of time, and each had a definable trade territory which was only partially dependent upon waterborne commerce. The economic analysis, therefore, had to identify the commerce which the port might expect to handle, and then identify the requirements necessary to realize the potential.



PORT MASTER PLANS AND PORT ENGINEERING

A small sample of Harris' many port facilities projects follows:

Port Said (Egypt) Master Plan

The existing Port Said is to be rehabilitated and modernized and a new port site, either on the Mediterranean or on the Suez Canal, will be considered in a study recently begun.

The objectives of the project are to:

- Prepare a program for the rehabilitation and modernizing of the existing facilities.
- Prepare a detailed master plan for the new port.
- Provide technical, economic and financial advice.
- Prepare a feasibility study covering the first-stage development of port facilities.

Port of Pascagoula, Mississippi

Feasibility, location study, concept development and design of public bulk terminal and facilities. This work was done with Hewitt-Robins. Harris' responsibility included commodity movement and cost analysis, site location, facilities concept design, cost estimates and operating plan.

Client: Jackson County Port Authority

Port of Muskogee, Oklahoma

Economic and engineering feasibility studies, design and inspection of construction for a new barge terminal and industrial park on the Arkansas River at Muskogee.

Client: Muskogee Area Planning Commission



HARRIS

Port of Haina, Dominican Republic

Design and supervision of construction for the expansion and rehabilitation of the Port of Haina at the mouth of the River Haina on the southern coast of the Dominican Republic. Existing port was expanded to handle vessels with a maximum of 130,000 DWT. Included in the contract were: administration building, onloading and offloading facilities, warehousing, office space, communications equipment and navigational aids. A new turning basin was provided in an area where the containerized facilities were located. A diversion channel was also incorporated to eliminate riverine flow from the facilities.

Wood River, Illinois

Design of barge dock at Wood River, Illinois on the Mississippi River. Designed by Harris, the water-level dock provides a minimum of maintenance difficulty of moving parts.

Venice, Louisiana

Design of Louisiana's river oil terminal at Venice.

Client: Getty Oil Company

Port of Chittagong, Bangladesh

Master plan for the long-range development of port facilities for the Port of Chittagong located on the Darnafuli River.

Client: Chittagong Port Trust

Selected Sites, Bangladesh

Economic and technical feasibility study for the development of inland water ports at Dacca, Narrayangani, Chandpur, Barisol, Khuina and Chalna.

Client: United States Agency for International Development



IMPROVEMENT OF OPERATIONS AT EXISTING PORTS

Most port planning projects consider operational changes needed to accommodate cargoes in new or expanded facilities. In this section, however, we include only studies which had as their primary purpose operational and organizational improvements.

Curacao, Netherland West Indies

This study for the Curacao Shipping Association investigated and recommended opportunities for consolidation of operations, management and materials handling equipment at various locations in the Harbor for the private port operations.

Iran

As a separate port of the overall National Ports Study, existing ports were studied from both organization and operations viewpoints to determine how to improve efficiency and service.

Mexico

As in Vran, existing ports were studied to optimize existing capabilities. The ports of Tampico and Vera Cruz are currently in on-going implementation stages to carry out recommendations which were made.

Montevideo, Uruguay

This was a very comprehensive study of all aspects of the port's management, operations, equipment, financial structure, and national significance. On the job training followed during the implementation of the recommendations.



HARRIS

ADMINISTRATIVE/FINANCING/RATE-TARIFF STRUCTURES

Feasibility studies for revenue bond financing, in which Harris has been significantly involved, considered the effects of administrative, financing and rate-tariff structures. The studies listed below are those in which a primary purpose involved one or more of these factors.

Port Manatee

As a follow-up of the feasibility and planning studies, Harris served as port advisor during the early years in the areas of administration planning, financial management, and rates and handling charges for specialized commodities.

Curacao, Netherlands West Indies

As a specially identified part of this study, port handling charges were to be analyzed based both on viability from a local operations standpoint and on relationship to charges at other competitive ports in the Caribbean.

New London, Connecticut

Analyses of rates currently being charged vs. cost of performing services vs. charges at alternative ports is a specific task in this study. Another is the recommendation of the management and operating structure as well as the financial program under which the port should operate.

Mexico

The various ports in the country have been operating as local entities with widely varying tariffs and handling charges. A part of the overall study was the recommendation of a rational set of rates which would recognize costs of performing services while at the same time providing a uniformity for industry to work with.



Other

Most studies for U.S. ports have involved costs for specialized bulk commodities since tariffs for general commerce are generally regionally determined and not within the exclusive control of a single port. Examples of such specialized studies are:

- Charges for bulk cement, phosphate and rock;
- Charges involving movement of heavy machinery where land rental, heavy equipment and port facilities were combined;
- Throughput charges for handling liquid petroleum products under differing assumptions of port responsibility;
- Charges for shipment of pelletized meal where the port provided unloading and pelletizing operations as well as shipping facilities.



5.2 COMPUTER CAPABILITIES

Harris' computer capabilities include an extensive software library of proprietary and non-proprietary programs. The programs run on IBM 370/168 or a Control Data Corporation (CDC) Cyber 74 to which the office is connected by two remote entry terminal systems including high-speed card readers and line printers.

Other than the Corps of Engineers and U.S. D.O.T. modeling packages, Harris' proprietary COMFLO (Commodity Flows) program package performs comparative cost or rate analyses of shipping routes through alternative terminals. The program, which is coded in FTN FORTRAN and executes on a CDC 74 system, is composed of these parts:

1. Preferential terminals analysis
 - a. Comparison of unit systems transportation costs
 - b. Comparison of unit systems transportation rates
2. Existing flow analysis
3. Tabulation of existing and/or potential flows
 - a. Potential flows volume and cost savings
 - b. Potential flows market marginality
 - c. Existing Flows

5.2.1 Preferential Terminals Analysis. The preferential terminal program determines the rate to ship a unit volume of cargo from a particular node to a foreign or domestic destination through each terminal. By comparison of these costs, the program identifies the least and second-least cost terminal for each destination/commodity. Tables of all unit costs are printed out, as are summary tables of least-cost ports. For rates, where directionality significantly affects these results, two separate runs yield summary tables of least-cost Port of Entry and Ports of Exit. Finally, the preferential terminal program saves on file a matrix of least-cost terminals and their respective cost savings over the second-least cost terminal.



5.2.2 Existing Flows Analysis. The existing flows analysis is performed by the preferential terminal program when a software switch is set. Input consists of identifying information for an existing flow, including volume and existing P.O.E. The program selects the least-cost terminal for comparison. Necessary rates and mileages are obtained by automated table look-up. Additional terminals may be compared by selection. The program computes and prints each component of shipping costs for each terminal being compared including:

vessel operating cost	wharfage and docking
vessel cost in port	inventory
loading and unloading	overland carrier, i.e., rail or truck

In the case of container cargo, three least cost terminals are selected, one for each unit value of cargo. Finally, for each flow, the existing flows program saves on file identifying information including volume, existing P.O.E., least-cost alternate P.O.E. (unless existing is least-cost) and cost savings of alternate over existing.

5.2.3 Tabulation. Several forms of tabulation are possible using one post-processor program with alternative software switch settings. Potential flows volume and cost savings (over existing port) are tabulated using the same information and the cost savings (over next least-cost port). Flows with unit cost savings outside a chosen dollar range are rejected.

Existing flows are tabulated directly from input cards. Text string recognition routines automatically identify the names of the countries, foreign destinations and ports, avoiding manual entry of code numbers. After index numbers are assigned to a flow, it is entered in the proper position in matrix comprising the summary table values, which is printed after all flows are processed.



5.2.4 Modeling and Simulations. Harris has employed simulation techniques to study oil and petrochemical marine terminals, bulk carrier terminals and general cargo ports. Operating conditions simulated include importing and exporting and combined importing and exporting of a number of commodities or products simultaneously, multi-terminal situations involving topping-off, transshipment and complete two-ended commodity movement set ups. The physical elements of marine terminals or ports which have been considered in simulation studies are:

- multiple classes on ships
- general and special purpose berths
- cargo handling facilities (including pipelines)
- storage facilities (tankage, stock piling, silos)
- land transportation facilities
- natural phenomena (weather, tides, currents)
- operational aids (quay side equipment, tugs, crews)
- port throughput capacity

Other points of special interest are:

- short term forecasting of commodity movements
- extensive priority setting rules for berth utilization
- optimum utilization of storage facilities
- shuttling

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